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POLLUTION OF THE INTERSTATE WATERS OF THE HUDSON RIVER AND ITS TRIBUTARIES NEW YORK AND NEW JERSEY. PROCEEDINGS OF CONFERENCE HELD AT NEW YORK, NEW YORK, SEPTEMBER 28-30, 1965. VOLUME 1

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Washington, D.C.

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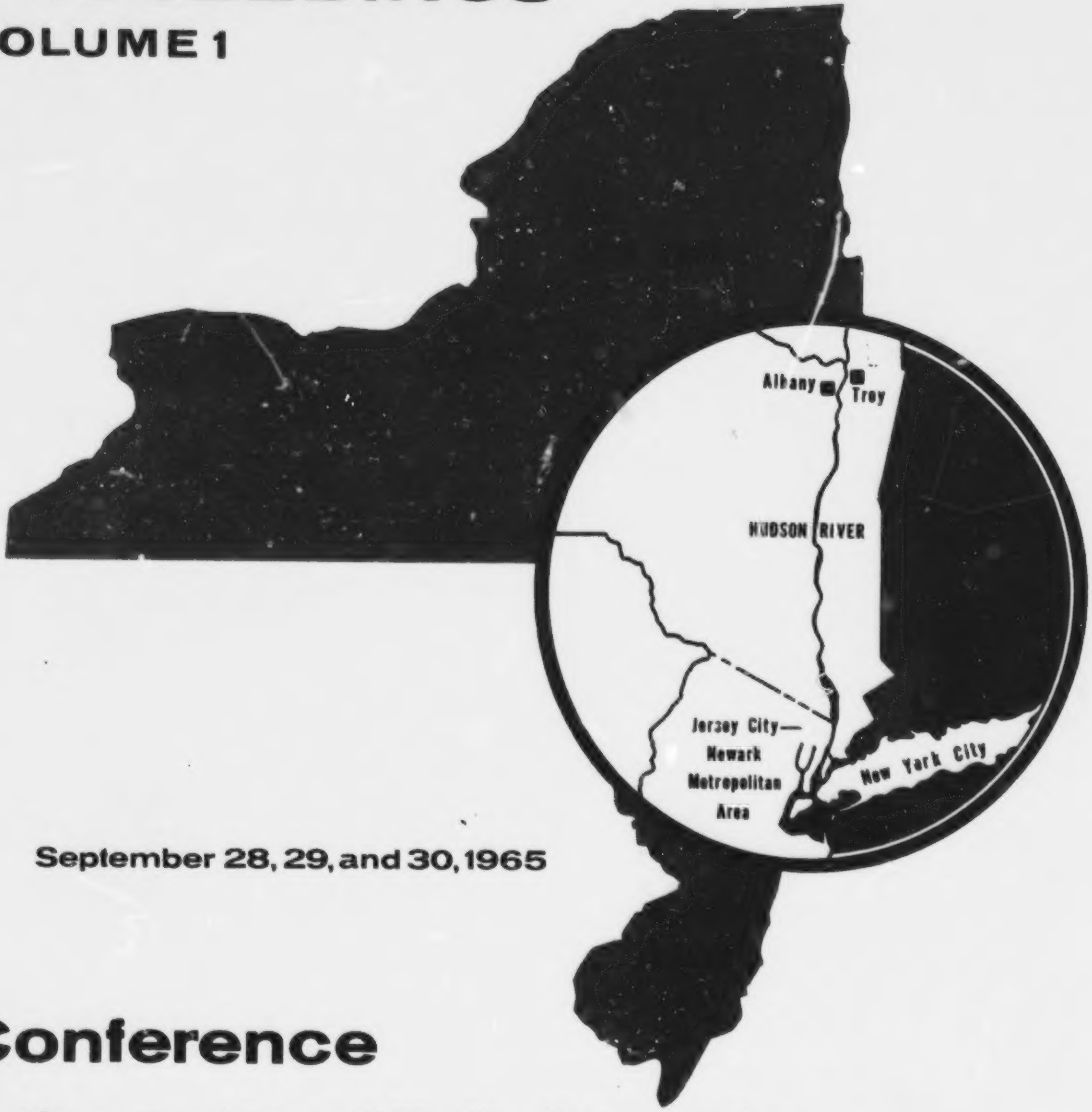
Albany
Troy
HUDSON RIVER
Jersey City—
Newark
Metropolitan
Area
New York City

September 28, 29, and 30, 1965

Conference

In the matter of Pollution of the Interstate Waters of the Hudson River and its Tributaries - New York and New Jersey

U. S DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Conference in the Matter of Pollution of the Interstate Waters of the Hudson River and its Tributaries, convened at 9:30 a.m., Tuesday, September 28, 1965, at the Waldorf-Astoria Hotel, New York, New York.

PRESIDING:

Mr. Murray Stein, Chief, Enforcement Branch, Water Supply and Pollution Control, Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C.

CONFEREES:

Robert D. Hennigan, Director of Water Resources Services, State of New York Department of Health

Dr. Roscoe P. Kandle, Commissioner, New Jersey State Department of Health

Earl J. Anderson, United States Department of Health, Education, and Welfare, Regional Program Director, Region II, New York, N. Y.

CONFEREES (Continued):

Thomas R. Glenn, Jr., Director and Chief Engineer, Interstate Sanitation Commission

PARTICIPANTS:

Hon. John W. Gardner, Secretary of Health, Education, and Welfare

Hon. Nelson A. Rockefeller, Governor of the State of New York

Hon. Richard L. Ottinger, Member of Congress from the State of New York

Hon. Jacob K. Javits, United States Senator from the State of New York (by Miss Patricia Connell)

Hon. Joseph Y. Resnick, Member of Congress from the State of New York (by John W. Logan)

Dr. Harold G. Wilm, Conservation Commissioner, Chairman, New York State Water Resources Commission

Dr. Hollis S. Ingraham, Commissioner, New York State Department of Health

Dr. Roscoe P. Kandle, Conferee and Commissioner, New Jersey State Department of Health

PARTICIPANTS (Continued):

Eugene H. Nickerson, Nassau County Executive, Nassau County

Mark Abelson, Northeast Regional Coordinator, United States Department of the Interior

Colonel R. T. Batson, District Engineer, United States Army Engineer District, New York

Brigadier General David S. Parker, Division Engineer, North Atlantic Division, Corps of Engineers

Hon. Robert F. Kennedy, United States Senator from the State of New York

Richard M. Greening, Regional Hydrologist, Weather Bureau, Regional Office, Environmental Science Services Administration, New York, New York

Olin T. Mirteenes, District Ship Custody Officer, Maritime Administration, United States Department of Commerce, New York, New York

Hon. Edwin G. Michaelian, County Executive of Westchester County, member of the Advisory Committee to the Surgeon General of the United States on Urban Health Affairs

William H. Osborn, President of Hudson River Conservation Society

PARTICIPANTS (Continued):

Paul De Falco, Jr., Project Director, Hudson-Champlain and Metropolitan Coastal Comprehensive Water Pollution Control Project, United States Department of Health, Education, and Welfare, Public Health Service, Metuchen New Jersey

Dr. Clarence M. Tarzwell, Director, National Marine Water Quality Laboratory, United States Public Health Service, Wakefield, Rhode Island

Lester E. Blaschke, Chief, Office of Estuarine Surveillance and Sanitary Control, Shellfish Sanitation Branch, Division of Environmental Engineering and Food Protection, United States Public Health Service

Hon. Clifford P. Case, United States Senator from the State of New Jersey (by Gar Kaganowich)

Hon. John V. Lindsay, Member of Congress from the State of New York

Hon. Robert F. Wagner, Mayor of the City of New York

Dr. Natale Colosi, Chairman, Interstate Sanitation Commission

Robert D. Hennigan, Conferee and Director of Water Resources Services, State of New York Department of Health

PARTICIPANTS (Continued):

Donald E. Lynch, Executive Director, Citizens Committee for Clean Water, New York

Mrs. Kenneth Greenawalt, President, League of Women Voters, New York, New York

Alan Gussow, Citizens Committee for the Hudson River, Congress, New York

Mrs. Helen Putnam, Friends of the Hudson, New York, New York

Russell D. Butcher, Conservation Specialist, National Audubon Society, New York, New York

Gwynn Thomas, Director of Associated Industries of New York State, Inc.

Mrs. John Wallace, New York State Congress of Parents and Teachers, Inc.

Dr. H. Jackson Davis, Commissioner of Health, Rensselaer County, Troy, New York

Stephen G. Doig, Jr., County Attorney, Rockland County, New City, New York

Rod Vandivert, Scenic Hudson, New York, New York

Hon. Ogden R. Reid, Member of Congress from the State of New York

PARTICIPANTS (Continued):

Charles Lowden, Chairman, New Jersey State Jaycees, Clean Air and Clean Water Program, (by Ronald Stevack)

Hon. John G. Dow, Member of Congress from the State of New York

THOSE IN ATTENDANCE:

J. A. Abbott, Public Relations Manager, National Paper Company, 220 East 42nd Street, New York City

Mark Abelson, Regional Coordinator, United States Department of the Interior, 59 Temple Place, Room 602, Boston, Massachusetts 02111

Pearl Abraham, League of Women Voters, 1592 Jesup Avenue, Bronx, New York

Richard T. Anderson, Planner, Regional Plan Association, 230 West 41st Street, New York City

Richard P. Aulie, Teacher-Observer, Yale University, 1285 Boulevard, New Haven, Connecticut

G. E. Balch, Technical Supervisor, Allied Chemical Corporation, 40 Rector Place, New York City

Nicholas L. Barbarossa, Assistant Director, Division of Water Resources, Conservation Department, State Office Building Campus, Albany, New York

Colonel Richard T. Batson, District Engineer, United States Army, New York District, 111 East 16th Street, New York, New York

Quentin R. Bennett, Marine Fisheries Sanitarian, New York State Conservation Department, Oakdale, New York

Mrs. B. Bernstein, Regional Attorney, Region II, Public Health Service, 42 Broadway, New York, New York

THOSE IN ATTENDANCE (Continued):

Charles F. Bier, Pollution Control Engineer, General Aniline and Film Corporation, P.O. Box 12, Linden, New Jersey

Kenneth Biglane, Eastern Officer, Technical Services Branch, United States Department of Health, Education, and Welfare, Washington, D. C.

Hayse H. Black, Industrial Wastes Consultant, Public Health Service, 4676 Columbia Parkway, Cincinnati, Ohio 45226

Lester E. Blaschke, Chief, Office of Estuarine Surveillance, Public Health Service, Washington, D. C.

Ralph Bloom, Jr., Manager, Art. Carbon Dev., FMC Corporation, P.O. Box 8, Princeton, New Jersey

Mary K. Boland, Public Relations Associate, Sydney Norrell and Company, 32 East 57th Street, New York, New York

S. A. Bontempo, Commissioner, Interstate Sanitation Commission, Florham Park, New Jersey

W. O. Boschen, President, Ralph B. Carter Company, 192 Atlantic Street, Hackensack, New Jersey

Lieutenant JG Carl D. Bossard, Chief, Recreational Boat Safety Section, 3rd Coast Guard District, 636 Custom House, New York, New York

M. W. Bowen, 25 W. 54th Street, New York, New York

THOSE IN ATTENDANCE (Continued):

C. Branchini, Manager, Technical Services, Equitable Life, 1285 Avenue of the Americas, New York, New York

Theodore E. Brenner, Research Director, Soap and Detergent Association, 295 Madison Avenue, New York, New York

John B. Burt, Assistant Pollution Control Engineer, General Aniline and Film Corporation, P. O. Box 12, Linden, New Jersey

Russell D. Butcher, Conservation Specialist, National Audubon Society, 1130 Fifth Avenue, New York, New York

Edward S. Cabot, Executive Assistant, Senator Jacob K. Javits, 110 E. 45th Street, New York, New York

Claire W. Carlson, Assistant to the Chief Engineer, West Virginia Pulp and Paper, 230 Park Avenue, New York, New York

George B. Case, Chairman, Tarrytown Planning Board, 245 Benedict Avenue, Tarrytown, New York

Mrs. Hudson Chapman, Water Resources Chairman, League of Women Voters, 242-10 Alameda Avenue, Douglaston, New York, 11362

Alfred B. Cherry, Waste Consultant, American Cyanamid Company, Berdan Avenue, Wayne, New Jersey 07470

THOSE IN ATTENDANCE (Continued):

E. E. Christofano, Industrial Hygienist, Hercules Powder Company, 910 Market Street, Wilmington, Delaware

Bradford Clark, Commissioner of Public Works, New York City, 1800 Municipal Building, New York, New York 10007

Joseph R. Clark, Associate, Parsons, Brinckerhoff, Quade and Douglas, 165 Broadway, New York, New York

Edward J. Cleary, Executive Director, Ohio River Valley Water Sanitation Commission, 414 Walnut Street, Cincinnati, Ohio

Dr. Edward D. Coates, Public Health Physician, Rockland County, 11 New Hempstead Road, New City, New York

Dr. Morris M. Cohn, Consulting Engineer, New York City, New York, 1100 Madison Avenue

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J. M. Connolly, Partner, Connolly and Ross, 103 Park Avenue, New York, New York

John V. Connorton, Deputy Mayor, New York City, City Hall, New York, New York

THOSE IN ATTENDANCE (Continued)

T. R. Cooil, Parsons, Brinckerhoff, Quade and Douglas, 165 Broadway, New York, New York

Robert E. Copeland, O'Brien and Gere Cons. Eng., 1050 Genesee Street, Syracuse, New York

William F. Cosulich, Consulting Engineer, 333 Jackson Avenue, Syosset, New York

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Col. Riel S. Crandall, Engineer, United States Military Academy, USMA, West Point, New York

H. Jackson Davis, M.D., Commissioner of Health, Rensselaer Co., Troy, New York, 17th and State Streets

Rodman Davis, Staff Member, Hudson River Valley Commission, Bear Mountain, New York

Paul De Falco, Jr., Director, Hudson-Champlain Project, Public Health Service

B. W. Dickerson, Senior Sanitary Engineer, Hercules Powder Company, Delaware Trust Building, Wilmington, Delaware

THOSE IN ATTENDANCE (Continued):

Donald G. Dickson, County Commissioner of Health, Rockland County, c/o County Office Building, New City, New York 10956

B. H. Dodge, Corps of Engineers, 90 Church Street, New York City, New York

Stephen G. Doig, Jr., County Attorney, Rockland County, 11 New Hempstead Road, New City, New York 10956

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Robert M. Drummon, Director of Water Management, Glens Falls, New York

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Alfred H. Fletcher, Director, Division of Environmental Health, State Health Department, Trenton, New Jersey

Richard E. Foerster, Greeley and Hansen, 233 Broadway, Room 1380, New York, New York

Arthur C. Ford, President, Board of Water Supply, 120 Wall Street, New York, New York

THOSE IN ATTENDANCE (Continued):

Richard Forster, State Health Department, Albany, New York

John H. Foster, Malcolm Pirnie Engineering partner, 522 - 5th Avenue, New York, New York

Thomas G. Frangos, Executive Director, Nassau County Council for Water Resources, 64 Smith Street, Rockville Centre, New York

Mrs. M. S. Friedlander, League of Women Voters, 131 East 23rd Street, New York, New York

John H. Friedman, Operating Engineer, American Cyanamid, Pearl River, New York

Wallace C. Fulton, Equitable Life Insurance Society, 1285 Avenue of the Americas, New York, New York

John Galandas, Newark College of Engineering, 323 High Street, Newark, New Jersey

Thomas P. Gallagher, P. H. Engineer, United States Public Health Service, Taft Center, 4676 Columbia Parkway, Cincinnati, Ohio

John W. Gardner, Secretary of Health, Education, and Welfare, Washington, D. C.

Edward V. Geismar, Chief Enforcement Officer, 42 Broadway, New York City, New York

Edwin E. Geldreich, Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati, Ohio

THOSE IN ATTENDANCE (Continued):

M. L. Granstrom, Rutgers University, New Brunswick, New Jersey

Mrs. Kenneth Greenawalt, President, League of Women Voters, 131 E. 23rd Street, New York, New York

Richard M. Greening, Weather Bureau, Regional Office, Federal Building, John F. Kennedy Airport, Jamaica, New York

Raymond Grop, Federal Power Commission, 346 Broadway, New York, New York

Alan Gussow, Citizens Committee for the Hudson River, 121 New York Avenue, Congers, New York

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Saul J. Harris, Reg. Prog. Div. for Rad. Health, 42 Broadway, New York, New York

John E. Harrison, Senior Sanitary Engineer, New York State Department of Health, 99 Church Street, White Plains, New York

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Murray Herman, Principal Engineer, Office of Administration, 250 Broadway, New York, New York

H. Heukelekian, Professor, Rutgers University, New Brunswick, New Jersey

Mary Hornaday, Staff, Christian Science Monitor, 588 - 5th Avenue, New York, New York

Thomas N. Hushower, Sanitary Engineer, United States Public Health Service, 42 Broadway, New York, New York

Dr. Hollis Ingraham, Health Commissioner, New York State, Albany, New York

D. T. Jeon, Dow Chemical Corporation, 45 Rockefeller Plaza, New York, New York

Stephen J. Johnson, President, Aeration Systems, Inc., P. O. Box 753, Bridgehampton, New York

Dr. Trois Johnson, Regional Health Director, Public Health Service, New York, New York

Gar Kaganowich, Executive Assistant, Senator Clifford P. Case, Washington, D. C.

THOSE IN ATTENDANCE (Continued):

Ben D. Karmatz, Middlesex Federation of Sportsmen, 113 Johnson Street, Highland Park, New Jersey

W. E. Katz, Ionics, Inc., 65 Grove Street, Watertown, Massachusetts

Thomas B. Keane, President, Keane Construction, W. 27 Glen Avenue, Paramus, New Jersey

Mrs. Forrest E. Kendall, League of Women Voters, 240-06 - 53rd Avenue, Douglaston, 62, New York

Robert F. Kennedy, United States Senator from the State of New York, Washington, D. C.

Bernard Kessler, Attorney, Hyde Park, New York

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L. M. Klashmore, Regional Program Director, Water Supply and Pollution Control, Public Health Service, Denver, Colorado

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Kenneth Koward, Consolidated Edison Company, 4 Irvin Place, New York, New York

Jack Krauskopf, Office of Mayor Wagner, City Hall, New York

THOSE IN ATTENDANCE (Continued):

Peter Kuh, Enforcement Branch, United States Public Health Service, Washington, D. C.

J. E. Kussmann, St. Regis Paper Company, 33 Driftway Lane, Darin, Connecticut

George Lamb, 50 North Street, Rye, New York

Howard S. Lamp'l, Chief, Harbor Supervision Branch, United States Army Engineer District, New York, #4 Heinrich Road, Somerset, New Jersey

Richard A. Lane, Sanitarian, DRH, Public Health Service, 42 Broadway, New York

N. J. Lardieri, Acting Head, Water Quality, Delaware River Basin Commission, 25 Scotch Road, Trenton, New Jersey

Mrs. D. N. Larson, Water Research Chairman, League of Women Voters, New York, New York

Douglas K. Larson, Senior Assistant Sanitary Engineer, Public Health Service, 42 Broadway, New York, New York

John R. Latham, Manager, Utility Services, American Cyanamid Company, Lederle Laboratories Division, Pearl River, New York

G. E. Leone, M.D., Commissioner of Health, Suffolk County, River Head, New York

THOSE IN ATTENDANCE (Continued):

W. C. Lepkowski, Assistant Editor, Chemical and Engineering News, 1155 - 16th Street, N. W., Washington, D.C.

T. W. Lesperance, Associate Editor, Water Works and Wastes Eng., 466 Lexington Avenue, New York, New York

Harry C. Levin, Director, Community Relations, American Cyanamid, Wayne, New Jersey

Harvey Lieber, City College Department of Political Science, 778 - 610th Street, Brooklyn, New York

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L. W. Livingston, Utilities Superintendent, Union Carbide Corporation, River Road, Bound Brook, New Jersey

John W. Logan, District Representative, Joseph Y. Resnick, Congressman, 70 Market Street, Poughkeepsie, New York

R. Longood, Health Pub. Editor, New York State Health Department, 84 Holland Avenue, Albany, New York

THOSE IN ATTENDANCE (Continued):

Joseph W. Ludlum, Staff Advisor, New Jersey State Chamber of Commerce, 54 Park Place, Newark, New Jersey

D. I. MacCalman, Control Officer, Continental Can Company, 633 - 3rd Avenue, New York, New York

Joseph MacDonald, Assistant Editor, Engineering News Record, 330 W. 42nd Street, New York, New York

Donald A. MacHarg, Counsel, New York State Health Department, 84 Holland Avenue, Albany, New York

Kenneth M. Mackenthun, Aquatic Biologist, Public Health Service, RATSEC, Cincinnati, Ohio

Everett L. MacLeman, Director, Del. Estuary Comprehensive Study, 321 Chestnut Street, Philadelphia, Pennsylvania

Ronald Macomber, Associate Director, Field Operation, Public Health Service, Narragansett, Rhose Island

John L. Mancini, Engineer, Hydroscience, 315 Franklin Avenue, New Jersey

Jack M. Marshall, President, Ekroth Laboratories, 2123 - 84th Street, Brooklyn, New York

D. B. Martin, Hudson River Conservation Society, 145 E. 49th Street, New York, New York

Leroy G. Martin, Reg. Interstate Carrier Cons., Public Health Service, 42 Broadway, New York, New York

THOSE IN ATTENDANCE (Continued):

Sylvan C. Martin, Associate Regional Health Director, Public Health Service, 42 Broadway, New York, New York

Dean S. Mathews, P.E., Regional Program Director, DAP, Public Health Service, 42 Broadway, New York, New York

James McCall, Engineer, Roy F. Weston, Inc., 4 St. Albans Avenue, Newfocon Square, Pennsylvania

E. G. Michaelian, County Executive, Westchester County, White Plains, New York

Charles F. Miles, Jr., Acting Chairman, Division of Water Pollution Control, New York City Health Department, 93 Worth Street, New York, New York

D. F. Miller, Salesman, Aeration Systems, Bridgehampton, New York

E. Powers Mincher, Assistant to the Commissioner, New Jersey State Department of Health, Harbourton Road, Pennington, New Jersey

Olin T. Mirteenes, District Ship Custody Officer, Maritime Administration, 45 Broadway, New York, New York

Miss Doris Mix, Interested Visitor, 445 E. 58th Street, New York, New York

Dr. Alan H. Molof, Associate Professor, Civil Engineering, New York University, University Heights, Bronx, New York

THOSE IN ATTENDANCE (Continued):

F. W. Montanari, New York State Conservation Department, Albany, New York

C. D. Morelli, Regional Sales Manager, Infilco Division, Fuller Company, 380 Madison Avenue, New York, New York

George Morrison, Sr. San., Public Health Service, 42 Broadway, New York, New York

D. L. Muss, Associate Professor, Civil Engineering, City College of New York, 140th Street at Convent Avenue, New York, New York

W. J. Mylers, 1321 River Road, Edgewater, New Jersey

Eugene H. Nickerson, Nassau County Executive

Mrs. J. W. Noorman, Acting Secretary, Scenic Hudson Preservation Conference, Room 318, 205 East 42nd Street, New York

D. J. O'Connor, Professor of Civil Engineering, Manhattan College, Riverdale, New York 71, New York

Joseph B. O'Connor, Regional Director, Department of Health, Education, and Welfare, 42 Broadway, New York, New York

William A. Olsen, Planner Consultant, New York City Planning Commission, 252 East 61st Street, New York, New York

THOSE IN ATTENDANCE (Continued):

Thomas E. O'Rourke, Administrative Officer, Public Health Service Hospital, Staten Island, New York

William H. Osborn, President, Hudson River Conservation Society, 145 E. 49th Street, New York 17, New York

Eustis Paine, Congressman Carlton J. King representative, Willsboro, New York

Frank L. Panuzio, Dep. Ch., Eng. Div., United States Army Engineer District, 111 East 16th Street, New York, New York

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Norman H. Parsons, League of Women Voters, 420 E. 23rd Street, New York, New York

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Stanley Pinel, Chief Engineer, City Adm. Office, 250 Broadway, New York, New York

THOSE IN ATTENDANCE (Continued):

W. H. Plummer, Attorney, General Counsel's Office, Sterling Drug, 41 East 42nd Street, New York 17, New York

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Thomas P. Quirk, Quirk, Lawler and Matusky, Jochurat Street, New York, New York

Otto F. Reyholec, Corps of Engineers, Hydraulic Engineer, New York, New York

Rocco D. Ricci, Public Health Service, 42 Broadway, New York, New York

Frederick Richardson, 46 Bayard Street, City of New Brunswick, New Jersey

F. R. Riley, Consultant, American Cyanamid, Berdan Avenue, Wayne, New Jersey

James R. Riner, V.A. Hospital, Eng. Officer, Montrose, New York

Nelson A. Rockefeller, Governor of the State of New York, Albany, New York

THOSE IN ATTENDANCE (Continued):

Harold Romer, Director, New York City Department of Health, 93 Worth Street, New York, New York

James H. Rook, Director of Industrial Hygiene, American Cyanamid, Berdan Avenue, Wayne, New Jersey

Irwin L. Rosenstein, Graley's Hansen Eng., 233 Broadway, Room 1380, New York, New York

Virginia B. Ross, New Jersey Chapter National Society for Const. Secur., 1320 River Road, Edgewater, New Jersey

John Roughan, Manager Comm. Development, Chemstrand Co., 350 - 5th Avenue, New York, New York

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Ernest R. Segesser, New Jersey Department of Health

Robert Shapiro, Eastern Biochemical Laboratories, Director, 159-07 - 14th Avenue, New York, New York

R. H. Shaw, Assistant Director, New Jersey Health Department, Trenton, New Jersey

THOSE IN ATTENDANCE (Continued):

Richard W. Sherman, United States Navy, San. Eng., New York City, New York

David Lee Shernan, Assistant, Senator Javits, 110 E. 45th Street, New York, New York

Elwood W. Shomo, ITT-Federal Electric Corporation, Industrial Park, Paramus, New Jersey

Dr. Carl N. Shuster, Jr., Director, Northeast Shellfish San. Research Center, Public Health Service, Narragansett, Rhose Island

A. D. Sidio, Public Health Engineer, Public Health Service, 2676 Columbia Parkway, Cincinnati, Ohio

Laura Silvers, Secretary to L. W. Roznoy, Olin Mathieson, 460 Park Avenue, New York 22, New York

Colonel I. H. Simmons, Surgeon-FUSA, Governor's Island, New York, New York

Robert C. Singer, Public Relations Division, Soap and Detergent Association, New York City, 295 Madison Avenue, New York, New York

Arnold Smith, Manager Eng., Hydrotechnic Corporation, 641 Lexington Avenue, New York, New York

Harry F. Smith, Jr., Regional Water Supply Consultant, Public Health Service, 42 Broadway, New York, New York

THOSE IN ATTENDANCE (Continued):

John Smith, PE, Editor, Eng. National Council on Streams, 271 Madison Avenue, New York, New York

J. J. Sofer, Student, University of Colorado, 42-02 Layton Street, Elmhurst, Long Island

R. Hobart Souther, Research Consultant, Buchart Horn Eng., 501 Washington Street, Greensboro, North Carolina

Mr. Elroy F. Spitzer, Eng.-Editor, The American City Magazine, 757-3rd Avenue, New York 17, New York

Mrs. J. Hammond Steele, Pilot Club, 530 E. 23rd Street, New York, New York

S. W. Steffensen, Director of Water Pollution Control, New York City - D.P.W., 40 Worth Street, New York, New York

Murray Stein, Chief, Enforcement Branch, Washington, D. C.

Donald B. Stevens, Associate Sanitary Engineer, New York State Department of Health, 84 Holland Avenue, Albany, New York

John S. Stillman, Congressman John Dow's office, 277 Park Avenue, New York, New York

William F. Stocker, General Chemical Division, Ind. Relations, P.O. Box 70, Allied Chemical, Morristown, New Jersey

THOSE IN ATTENDANCE (Continued):

James F. Stomber, JFS Industries, Inc., 12 Broad Street, Red Bank, New Jersey

Ernest B. Stubing, Veterans Administration Hospital of Irvington, 85 Main Street, Irvington, New York

Lester A. Sutton, Chief, Construction Grants, Region II, Public Health Service, 42 Broadway, New York, New York

Clarence M. Tarzwell, Director National Marine Waters, Public Health Service, Route 7, Box 159, Post Road, Wakefield, Rhode Island

Robert V. Thomann, Technical Director, Public Health Service, 321 Chestnut Street, Philadelphia, Pennsylvania

A. A. Thomas, Senior Associate, Metcalf and Eddy, 1200 Statler Building, Boston, Massachusetts

E. G. Thomas, Director of Government Affairs and Executive Assistant to the President, Associated Industries of New York State, Inc., 30 Lodge Street, Albany, New York

Meredith H. Thompson, New York State Health Department, Assistant Commissioner, 84 Holland Avenue, Albany, New York

M. J. Tonkel, New York City Corps of Engineers, 90 Church Street, New York, New York

THOSE IN ATTENDANCE (Continued):

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Dunton F. Tynan, Assistant Solicitor General, New York State Attorney General, State Capital, Albany, New York

Major F. R. Ulrich, United States Army Engineer District, 111 E. 16th Street, New York, New York

Eugene Underwood, Jr., Assistant, Senator Frederic S. Berman, 155 E. 93rd Street, New York, New York

Glenn C. Van Bramer, Legislative Assistant to Congressman Joseph Y. Resnick, Washington, D. C.

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Dr. Vincent J. Vitagliano, Scient. Mkting Repr. IBM, 425 Park Avenue, New York, New York

Mayor Robert F. Wagner, Mayor of the City of New York

Mrs. John Wallace, Chairman State Legislation, 113 Locust Street, Garden City, New York

Graham Walton, Public Health Service, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati, Ohio

William H. Wechter, dq. First U.S. Army, 447 E. 14th Street, New York, New York

THOSE IN ATTENDANCE (Continued):

Dr. Mitchell Wendell, Counsel, ISC, 10 Columbus Circle, New York, New York

Mrs. Helen Crooty West, Women's City Club of New York, 6 West 48th Street, New York, New York

George W. Whetstone, Hydrologist, United States Department of the Interior, 226 GSA Building, Washington, D.C.

Robert O. White, United States Bureau of Public Roads, District Engineer, 881 Madison Avenue, Albany, New York

Harold G. Wilm, Conservation Commissioner, Chairman, New York State Water Resources Commission

Russell L. Wingot, Executive Secretary, National Council, New York, New York

Albert Wurth, Chief Engineer, Public Health Service, Staten Island, New York

William A. Zeck, Counsel, Rockland County Sewer District, 57 Lafayette Avenue, Suffern, New York

James E. Zoes, President, Petroleum Pipe and Steel Company, 511 - 5th Avenue, New York, New York

Hon. John V. Lindsay, Member of Congress from the State of New York

Donald E. Lynch, Executive Director, Citizens Committee for Clean Water, New York

THOSE IN ATTENDANCE (Continued):

Hon. Ogden R. Reid, Member of Congress from the State of New York

Charles Lowden, Chairman, New Jersey State Jaycees, Clean Air and Clean Water Program

Hon. John G. Dow, Member of Congress from the State of New York

Basil Kontoyianes, Consultant, Water Supply and Pollution Control, Public Health Service, Department of Health, Education, and Welfare

PROCEEDINGS

OPENING STATEMENT
BY
MR. MURRAY STEIN

MR. STEIN: The conference is open.

This conference in the matter of pollution of the interstate waters of the Hudson River and its tributaries, involving the States of New York and New Jersey, the Interstate Sanitation Commission, and the United States Department of Health, Education, and Welfare, is being held under the provisions of Section 8 of the Federal Water Pollution Control Act.

Under the provisions of the Act, the Secretary of Health, Education, and Welfare is authorized to call a conference of this type when requested to do so by the Governor of a State, and when on the basis of reports, surveys, or studies he has reason to believe that pollution of interstate waters subject to abatement under the Federal Act is occurring.

Governor Nelson A. Rockefeller of New York and Governor Richard J. Hughes of New Jersey requested that the Secretary of Health, Education, and Welfare call a conference to consider pollution of the Hudson River.

In addition to that, we have had repeated requests for such a conference from Senator Robert Kennedy of New York.

In accordance with those requests and on the basis of reports, surveys, or studies, a notice of conference was sent to the official State water pollution control agencies of New York and New Jersey and the Interstate Sanitation Commission.

The area of the Hudson River to be considered at this conference encompasses the Upper Bay of New York Harbor, including Newark Bay, the Kill Van Kull, the East and Harlem Rivers, and the main stem of the Hudson River from the Battery to the head of navigation at the Federal Lock at Troy, New York.

The purpose of the conference is to bring together the State water pollution control agencies, the interstate agency, the representatives of the Department of Health, Education, and Welfare, and other interested parties to review the existing situation, the progress which has been made, to lay a basis for future action by all parties concerned, and to give the States, localities, and industries an opportunity to take any indicated remedial action under State and local law.

The conference technique is rather an old one. It is used by many State agencies informally in the normal conduct of their business in the field of water pollution control, and I think it poetic justice that we are here today dealing with pollution of these waters, because the concept of the conference was proposed by the United States Supreme Court as long ago as 1921, when they were considering the same or a similar situation in the famous case of New York against New Jersey, involving interstate pollution.

The Court said, among other things, and I would like to quote just a short portion of this decision:

> "We cannot withhold the suggestion, inspired by the consideration of this case, that the grave problem of sewage disposal by the large and growing population living on the shores of New York Bay is one more readily to be most wisely solved by cooperation study and by conference and mutual concession on the part of representatives of the States so vitally interested in it than by proceedings in any

"court however constituted."

I think now, more than forty years later, this statement of the Supreme Court is just as applicable as it was when it was made.

We strongly support the conference technique and we measure our success by the situations which are solved at the conference stages, rather than by the court actions we bring.

This is a conference between the New York State Department of Health, the New Jersey State Department of Health, the Interstate Sanitation Commission, and the United States Department of Health, Education, and Welfare. Those agencies may bring whomever they wish to the conference and have them participate in the conference. However, only the representatives of the official State and interstate agencies and the Department of Health, Education, and Welfare constitute the conferees.

The State of New York has designated as its conferee for the conference Mr. Robert Hennigan; New Jersey will be represented by Dr. Roscoe Kandle; and, the Interstate Sanitation Commission will be represented by Mr. Thomas Glenn. Mr. Earl Anderson of the Department of Health, Education, and Welfare, with headquarters in New York City. has been designated as conferee for the

Federal Government.

My name is Murray Stein. I am from Washington, D. C., headquarters of the Department of Health, Education, and Welfare.

Both the States and the Federal Government have responsibilities in dealing with water pollution control problems. The Federal Water Pollution Control Act declares that the States have primary rights and responsibilities for taking action to abate and control pollution. Consistent with this we are charged by law to encourage the States in these activities. However, the Secretary of Health, Education, and Welfare also is charged by law with specific responsibilities in the field of water pollution control, in connection with pollution of navigable and interstate waters which endangers the health or welfare of any persons. The Act provides that pollution of such waters, whether the matter causing or contributing to such pollution is discharged directly into such waters, or reaches such waters after discharge into a tributary of such waters which endangers the health or wefare of a person in a State other than that in which the discharge originates, is subject to abatement. The Act also states that the Secretary shall call a conference at the request of the Governor of any State if it involves pollution of interstate or navigable waters which is endangering the health or welfare of persons. The conference will be useful, we hope, in providing a clear picture of the problem, in delineating the progress which has already been accomplished, and in indicating what still needs to be done to correct the pollution problem in these interstate waters.

Now a word about the procedure governing the conduct of the conference. The conferees will be called upon to make statements.

In addition, I may make a statement also at the conclusion of the conferees' statement. The conferees will call upon their invitees to participate. Only the conferees will be permitted to ask questions or engage in a comment, because if we threw this open to the floor, we might be in this delightful city for longer than probably we would care to take up residence.

I think the technique we have used in past conferences has been useful in arriving at equitable solutions within a reasonable portion of time.

Then the conferees will adjourn into an executive session, and we hope we will be able to have a meaningful announcement, which will be made in public after that executive session.

Under the law, Secretary of Health, Education, and Welfare, Gardner, is required, at the conclusion of the conference, to prepare a summary of it which will be sent to all the conferees. The summary, according to law, must include the following:

1. Occurrence of pollution of interstate waters subject to abatement under the Federal Act;
2. Adequacy of measures taken toward abatement of pollution; and
3. Nature of delays, if any, being encountered in abating the pollution.

I would suggest that we direct our conference discussions to these points so we may have a meaningful summary.

Subsequent to the holding of a conference, the Secretary of Health, Education, and Welfare, is required to make recommendations for remedial action if such recommendations are indicated.

A record and verbatim transcript will be made of the conference by Mr. Al Zimmer. This is for the purpose of aiding us in preparing a summary, and also providing a complete record of what is said here. We will make copies of the summary and transcript available to the official water pollution control agencies of New York and New Jersey, and the Interstate Sanitation Commission. We have found that generally for the purpose of maintaining relationships within a State, that the people who wish transcripts should request them through their State or interstate agency, rather than come directly to the Federal Government. The reason for this is that we would prefer the people who are interested in the problem to follow their normal relations in dealing with State agencies rather than the Federal Government on these matters when the conference has been concluded. This has worked successfully in the past and we will be most happy to make this material available to the States and interstate agency for distribution.

I would suggest that all speakers and participants other than the conferees making statements come to the lectern and identify themselves for purposes of the record.

At this conference I think we are very honored to have as the first speaker the distinguished new Secretary of Health, Education, and Welfare, Secretary John W. Gardner.

Secretary Gardner.

Hon. John W. Gardner

(Applause.)

STATEMENT OF THE HONORABLE JOHN W. GARDNER, SECRETARY OF HEALTH, EDUCATION, AND WELFARE

SECRETARY GARDNER: Thank you, Mr. Chairman.

We are here today to begin with a very difficult task.

We must find a way to clean up the Hudson River, and, once the river is restored, we must keep it clean.

I think we can accomplish this, but it will not be easy. Certainly we cannot afford further delay.

President Johnson has urged us to a "new conservation" -- a new, national effort to protect and enhance the environment that we live in. The restoration of this majestic waterway will be a significant part of that effort. The tragedy is that we have waited so long.

Pollution of the Hudson River is not a new development. It has been going on for a long time and we have known what was happening.

A year ago some children fished a watermelon out of the river at 125th Street. It looked good to them. So they took it home and washed it and they ate it. Shortly afterwards, eight of them came down with typhoid fever. That was typhoid from the Hudson River.

But pollution had reached a dangerous level long before last year. A whole generation has been denied use of the Hudson for swimming in this area. The last swimming place was on the Jersey side, just above the George Washington Bridge. It was closed 35 years ago, and the entire river south of the bridge has remained closed to swimming ever since.

The lower Hudson is not the only area that has suffered. Up and down the Hudson Valley communities have watched the spoilage of their river and contributed generously to that spoilage. Beaches have been closed, warning signs posted. In many places signs aren't needed. The murky, malodorous water is forbidding enough.

The drought of the past few years has intensified this crisis. This year the river is down to half its normal flow. As the flow of the river drops, the effects of pollution multiply.

We like to think of ourselves as a civilized people. Yet it took a major drought to dramatize the fact that we have made one of our loveliest rivers a torrent of filth.

During the few moments that I am here speaking to you, communities along the Hudson will pour more than 30 million gallons of raw or partially treated sewage into their river, and industrial plants will further foul this river. The cost of cleaning this pollution -- both municipal and industrial -- is expected to run close to $400 million. That is a formidable figure, but we can't afford not to pay it.

This river is the lifeblood of the cities and towns along its banks. Plans now being considered call for more than a tenfold increase in the use of the Hudson River for municipal water supplies in the next few years. Unless the river can be made free from pollution, communities using this water will have to pay even higher treatment costs and maintain the closest vigilance to be sure that their water is safe to use.

The American people are a very trusting people. We turn on the tap, we fill a glass with water, and drink it, confident that it is clean and safe. When you stop to think about it, that is an awesome trust. I am sure that every mayor and every governor has haunting thoughts about it today. I confess that I do.

We are here today to do whatever is necessary to keep that trust. I am gratified that Governor Hughes and Governor Rockefeller have requested this conference. I am heartened by the interest that Senators and Congressmen from New York and New Jersey have shown. I don't think it could have been more than half an hour after I was sworn in last month as Secretary of Health, Education, and Welfare that I received a telephone call from Senator Robert Kennedy on this subject.

As Mr. Stein has explained, this conference is the first step in a procedure designed to help us get clean water. It is also an acknowledgement of the Federal Government's responsibility with respect to working with the States and local communities to help solve this enormous problem.

Under the terms of our law, the Federal Government can pay part of the cost of waste treatment works; but only up to 30 percent. The bulk of the financing -- at least 70 percent -- must come from the States.

Since 1956, when this program started, the Department of Health, Education, and Welfare has paid out almost $4 million to help construct water pollution control facilities along the Hudson. The communities and States have contributed more than $11 million, for a total investment of more than $15 million. $15 million is not to be sneezed at, but we are facing a situation in which the nee in the Hudson Valley alone, is for four hundred million dollars. I think that shows very clearly the difference between the effort that has been made, and the effort that must be made now.

The responsibility rests finally with the people of this area -- with their State and local governments -- as it always has. The national government can help, and we will help to the extent possible. But the larger task is yours.

Governor Rockefeller, who has long taken a highly constructive interest in this problem, has asked the people of New York to support a one billion dollar bond issue for an effective clean water program in this State. I can assure you that every dollar of that amount will be needed. As a long-time resident and taxpayer of this State I want to say that I heartily endorse his proposal. I hope that the voters this November will deliver an overwhelming "yes" to that question. By supporting Proposition One they will be serving notice that they intend to preserve their valuable water resources -- that they will not default in their responsibility to themselves and the generations to follow.

We are facing an enormous challenge -- not only in New York and the Hudson Valley, but throughout this country -- wherever people have assembled to build their homes and industries. We are going to have to readjust our thinking processes and look at the true magnitude of the problems of pollution of our environment. Then we can begin to design corrective measures that will really fit.

I think we are beginning, but only beginning, to take the true measure of our task in correcting and preventing water pollution. Governor Rockefeller's plan is an example of a realistic estimate of the job to be done in this State.

The new Federal water pollution legislation is the result of a fresh look at Federal responsibilities in this field. It will enable us to be more responsive to the needs and problems of big cities. But it is only a step in that direction. I think we will have to do more.

Meanwhile, time is running out on us. The drought has exposed and dramatized the extent of pollution. Now let us get on with the job of restoring the Hudson to its place as a great, living river serving the many needs of the people in this area.

To return to the subject of this conference, we have been aroused much later than we would like to admit to a task of the greatest urgency. It will take a lot of determination and a lot of dollars, but in our affluent society, if you have enough of the first, you can usually find the second.

Let's get on with the job.

Thank you.

(Applause.)

MR. STEIN: Thank you.

Mr. Secretary, I know we have a lot of people in the audience who are professionals in the field of water pollution control, and I know that your speech has indicated to them that our job is going to be that much easier, because the indications are very clear of the kind of sympathetic climate we have at our Secretary's level.

All we have to do now is to get out and produce and do the job.

Thank you very much, Mr. Secretary, for your statement.

SECRETARY GARDNER: Thank you.

MR. STEIN: At this point, in dealing with the problem on the Hudson, I would like to call on a former boss of ours and a governor who has possibly come up with the most dramatic plan to deal with water pollution control in the country, Governor Nelson Rockefeller.

Governor Rockefeller.

(Applause.)

STATEMENT OF THE HONORABLE NELSON A. ROCKEFELLER, GOVERNOR OF THE STATE OF NEW YORK

GOVERNOR ROCKEFELLER: Thank you very much, Mr. Chairman.

Distinguished members of the panel, ladies and gentlemen:

Mr. Chairman, I listened with interest to your remarks, as well as the Secretary's, and I hope that we are more successful than we were in 1922 in the outcome of this gathering.

Let me say at the outset how pleased I am that the Secretary of Health, Education, and Welfare came here today to open this important conference.

Secretary Gardner presides over a far-flung empire of human concerns, and he brings unusual abilities and distinctions to his tasks.

Hon. Nelson A. Rockefeller

Through past associations with the organization he now leads, I am well aware of the range and complexity of his responsibilities. And I believe his appearance here today reflects that among his many concerns the issue of water pollution is now emerging with a high Federal priority.

Here in New York State we have been stirred by a deep concern with this problem, and we have launched a course of action which is unsurpassed in the nation.

Though pollution of the Hudson River is the special subject of our concern today, our resolve to end pollution extends to every part of New York State and of New Jersey, and our time schedule calls for accomplishing this task in the next six years. Our total commitment to this goal is the reason I joined with Governor Hughes of New Jersey in requesting this conference.

I believe we must exert every effort and enlist every ally to defeat pollution -- and the Federal Government can be a powerful ally in this cause.

We have asked for this Federal conference because the condition of the Hudson is caused by interstate pollution.

While the river is almost wholly a shining -- if somewhat tarnished -- jewel in New York's natural crown, pollution of it by New York affects New Jersey just as New Jersey pollution affects New York. The purpose of this conference is to identify that pollution and to arouse public opinion in support of corrective action.

We are not here today to point an accusing finger. We are not here to produce scapegoats. Accusations are not answers to pollution. The polluters are many -- communities and industries, government and private citizens.

In brief, the villain is modern man. He has heedlessly corrupted nature's great gift with reckless abandon.

Now we are in the process of reversing the tide of negligence that threatens to sweep away a precious resource and leave in its wake a debased residue.

This conference is another step evidencing that we are resolved to turn that tide.

As part of these proceedings, the United States Public Health Service is entering into the record a report on the conditions of the Hudson. The verdict of that report confirms the evidence gathered by New York State's Department of Health.

The Hudson River is polluted, and severely so.

In fact, the documentation of the sources, amount and type of pollution was largely provided to the Federal Public Health Service by the New York State Department of Health. We agree with the findings of this report. Furthermore, we are painfully aware of the impact of pollution.

The river from Troy to the south of Albany is one great septic tank that has been rendered nearly useless for water supply, for swimming, or to support the rich fish life that once abounded there.

The Hudson suffers intermittent contamination as it flows south of Albany, and by the time it reaches New York City, it is heavily polluted.

In New York Harbor, pollution harms commercial fishing, ruins swimming, spoils boating, impairs the industrial uses of water and presents an ugly affront to the nose and to the eye.

We know the dimensions of our pollution problem only too well, but we also know the solution to it.

Furthermore, New York State is the only State that has a program to completely eliminate pollution from all sources, within six years. The solution is expenditure of money on sewage treatment facilities on a scale truly commensurate with the enormity of the problem.

New York State is ready to invest $1 billion in this cause, if the voters approve the necessary Pure Waters Bond Issue which will be on the ballot this November.

I would like to thank the Secretary of Health, Education, and Welfare as a resident of New York and as a citizen here for his endorsement this morning of that bond issue. I am sure that that will have a very significant and helpful effect on the voter as he or she is considering what to do with this major question when in the voting booth this fall.

This is not something we discovered only yesterday. We have been developing the groundwork for such all-out action over a period of several years.

The State has lifted the debt limit on local governments for investment in sewage treatment systems.

The State has taken over the full cost of comprehensive sewage treatment planning studies for our communities.

The State has appropriated $8 million to help localities pay the cost of operating their treatment plants.

The State has also:

Stepped up its budget for waste treatment research;

begun to install an automated water quality monitoring system that will detect pollution instantly;

exempted industrial investment in waste treatment facilities from real property taxes;

allowed business a one-year depreciation write-off of these costs on their corporate franchise tax; and

given the State Health Department streamlined and strengthened enforcement powers which went into effect the first of this month, to deal quickly with the intractable polluters.

Under these new powers we have scheduled 34 hearings for alleged polluters in the past month. Ten hearings under the new law were held just in the past week.

As a result of these first ten hearings, already the Cities of Albany, Rensselaer, Castleton, and Waterford have agreed to take the necessary steps, with State financial assistance to end pollution of the Hudson between 1968 and 1971. We will take action in relation to all the polluters of the Hudson River by next summer under this new State law, which gives us the power of enforcement within a period of approximately a year, as against the previous enforcement powers which could be dragged on over a period of ten years.

We are applying this power firmly and evenly to community and industrial polluters alike. Among the hearings scheduled thus far, fifteen deal with industries and nineteen with communities.

In connection with this enforcement action by the State, the stubborn fact persists that pollution will only be ended when every community and every industry that now disgorges raw or poorly treated wastes into our waters has built adequate waste treatment systems.

The expense of constructing these facilities can only be described as staggering. Yet anything less than an all-inclusive attack on pollution is as futile as drawing water with a sieve.

A year or so ago, when I was discussing pollution of the Hudson with the Mayor of Albany, in connection with the plans for the development of a marina in that city, he pointed out that 35 millions of dollars invested in a better treatment system for his city would be difficult to justify as long as the City of Troy, only a few miles upstream, was dumping its raw sewage into the Hudson. Frankly, ladies and gentlemen, you wouldn't disagree with him.

It is obvious that to conquer pollution we must move on a broad, sweeping front to reach out and remove every source of pollution.

Consequently, I determined that our most effective move would be to lift much of the crushing financial burden of building sewage treatment systems from the backs of our local communities.

This decision to force a financial breakthrough lies at the heart of the pure waters program which I proposed last December. The goal of this program is to clean up our backlog of community and industrial pollution in this State in just six years -- and the price is $1.7 billion if we act now.

Not only the urgency of the problem but the economics of it cry out for immediate action.

Ever-increasing urbanization, the need to replace aging sewage facilities, and a four to five percent annual increase in construction costs, all conspire to make today's solution far more costly if we wait until tomorrow. We estimate that a delay in cleaning up the present pollution backlog will double the cost of the job in just ten years, so that it will go from 1 billion 700 million to almost 4 billion dollars if we did not act at the present time and waited ten years.

The heart of the Pure Waters Program is the State's leadership in a three-way sharing between local, State and Federal Governments of the cost of constructing interceptor sewers and sewage treatment plants.

Under the plan, the State will pay 30 percent, and will prefinance, if necessary, the Federal Government's full 30 percent share, leaving as the local government share only the remaining 40 percent of these costs. By relieving communities of 60 percent of the cost of building sewage treatment systems, the State's Pure Waters Program strikes at the core of resistance to pollution abatement.

This bold concept won the immediate and unanimous support of the New York State Legislature.

The Pure Waters proposal was endorsed by the leadership of both parties in an admirable realization that the protection of vital natural resources is not a proper arena for partisan politics. It was passed unanimously, and so the authorization for a State debt in the amount of $1 billion to provide the construction grants goes to the voters in a referendum next election day.

A billion dollars is truly an awesome sum. Yet the representatives of the people accepted it to a man as a price worth paying to rescue our waters.

Hon. Nelson A. Rockefeller

I am urging our citizens to give us this mandate and thus allow us to make their world healthier, to strengthen the economic base upon which their livelihood depends, to restore fully the pleasures of water recreation, and to beautify the environment from which so much of our spiritual strength is drawn.

The ending of pollution in New York State hinges on the Pure Waters Bond Issue. The Pure Waters Bond Issue hinges on a victory for Proposition One on the ballot in November.

As I said before, I was pleased to note that in announcing this conference, Secretary Gardner reaffirmed that the issue of environmental pollution is a responsibility of State government. By recognizing the value of creative and effective State government, he touched a cornerstone of my own political philosophy.

We appreciate greatly the technical assistance of the U. S. Public Health Service on water resource questions.

We profit from the fruits of Federal research in the laboratory and its studies in the field.

At the same time, this conference demonstrates a welcome Federal willingness to help the States meet their responsibilities; and so I would like to suggest specifically how Washington can help us.

We would welcome the support and endorsement of the Pure Waters Bond Issue by Federal authorities just as Secretary Gardner has done.

We believe the program is a model of State action, and our cause would be advanced by recognition from leaders in Washington. But the most essential and ultimately decisive support we seek from the Federal Government is adequate financial assistance to meet the stated Federal objective of 30 percent aid.

At present, New York State gets $5 million a year from Federal assistance in the face of a $1.7 billion need. Frankly, this is just a drop in the bucket.

At the present level of Federal assistance, it would take 100 years for the State to get the Federal 30 percent of the cost. Obviously, we just can't wait that long.

Last winter I appealed to President Johnson and members of his Cabinet, and appeared before the Blatnik subcommittee of the House Public Works Committee and the Muskie subcommittee of the Senate Public Works Committee, and our entire New York State Congressional delegation, urging that the President and the Congress recognize the magnitude and urgency of the problem, and act to assist the States and local communities on a scale that will permit this problem to be dealt with promptly and decisively.

Subsequently, Congress passed a bill to amend the present law. Under it, New York State would get close to $10 million a year instead of $5 million a year in Federal aid. Thus we would get the Federal 30 percent of the cost in 50 years instead of 100.

This, also, is completely unrealistic. As a nation, we cannot wait. We must act now. For pollution is growing, and the costs of sewage treatment systems are steadily increasing.

Furthermore, no provision is made in these amendments to reimburse States which advance a full Federal share to their communities in order to halt pollution now as New York State is doing.

I can best illustrate the inequity these conditions create by citing New York City's experience. New York City has spent over $226 million on sewage treatment facilities since the Federal-aid program went into effect. But the city has received only $2.7 million in Federal aid -- a scant 1.2 percent in Federal assistance.

As I stated before, I have discussed these inequities in the Federal law before the committees of both Houses of Congress, with the President, and with Secretary Gardner and Secretary Udall.

In every case, I have enjoyed a sympathetic hearing.

I am encouraged that some improvements have been written into recently enacted amendments to the Federal Water Pollution Control Act. But even the amended legislation and appropriations are utterly inadequate if this country really wants and intends to end pollution.

If the Federal Government is really serious about ending pollution, then I urge these further changes in the Federal Act:

1. An increase in the yearly authorization for the Federal program to $250 million. That seems reasonable.

2. Provision for Federal reimbursement to a State from future Federal appropriations where such a State advances all or a part of the Federal contribution to the cost of an eligible project.

3. Elimination of dollar project limits on Federal grants where States provide grants to localities for construction of eligible projects in order to provide a full 30 percent Federal share without regard to other limitations.

4. I also urge the Federal Government to grant tax incentives to spur industrial pollution abatement, as

we have done in New York State. The most obvious encouragement would be a one-year write-off against income tax.

During the past year, members of our New York State Congressional delegation have expressed repeated and deep concern with the pollution of the Hudson and other New York waters.

To these gentlemen I say again that they can make a genuine contribution towards cleaning up our waters by doing two things.

The first is to promote support for Proposition One, the State's Pure Waters Bond Issue, among their constituents. The second is to fight for the changes in the Federal-aid program that I have outlined here, to remove discriminatory features which now shortchange their State.

Four successive years of drought have further dramatized the necessity to clean up our waters.

This past summer, many of our communities imposed tight water restrictions and suffered water emergencies while polluted waters ran mockingly past their doorsteps. This paradox is perhaps the most striking here in New York City, where a daily average of about 11 billion gallons of water flowed past their parched metropolis last summer.

Pollution ruins potential water supplies, just as it poses a health threat, diminishes water recreation, impairs business growth, and offends our aesthetic sensibilities.

Yet, the approval of the Pure Waters Bond Issue by the people of New York State this November will conquer pollution because we have recognized its seriousness, and because we have created a program to monitor it.

I have complete confidence in our State Health Department, which is the Stage agency responsible for combating pollution. This Department, a public health leader in this Nation and throughout the world, has been doing a first-rate job of preventing new sources of pollution. Now, with the new enforcement legislation that went into effect this month, the Department has the power against existing pollution sources which will bring final victory for the people of the State.

We have set an ambitious goal and we welcome the Federal Government in helping us pursue that goal.

We ask the Federal Government to be a full financial partner as well as a helpful advisor, as we seek in six years to end pollution that has accumulated over a century.

If we win approval of the Pure Waters Bond Issue, and if we can get full and fair support from Washington, we will not be too late in restoring purity to the Hudson and to all the waters of New York State.

Thank you very much.

(Applause.)

MR. STEIN: Thank you, Governor.

Are there any comments or questions?

(No response.)

MR. STEIN: There were two points that the Governor made which I think are major points. The first is his reference to the support of the bond issue. I don't know what the limitations are, as a career public servant. I used to be a resident of New York and if I lived in New York I would vote for that bond issue and enthusiastically support it.

I know of no one in the Federal establishment who does not think that bond issue should not pass, and that it would not be a great step forward in combating pollution.

The second point I think the Governor made was that if the Federal Government is serious about pollution, and I think we are serious -- as a matter of fact, this is the first time I have a doubt. Generally people have thought we were too serious. I do think if we are serious and the States are serious and the cities are serious and the interstate agency is, we are going to get the job done and find ways to do it.

Next, I would like to call on the new breed of freshmen Congressmen who have made life in Washington for the last year or so so delightful. He is a Congressman who raised the issue of pollution control during his campaign vigorously and vociferously, and he is the kind of Congressman who, in the ensuing months while he was in office, did not forget his campaign speeches, promises and slogans, because he has been just as active for pollution control in the Congress, when it required standing up and fighting, as he was during his campaign.

Congressman Richard Ottinger.

(Applause.)

STATEMENT OF THE HONORABLE RICHARD
L. OTTINGER, MEMBER OF CONGRESS
FROM THE 25TH CONGRESSIONAL DISTRICT
OF THE STATE OF NEW YORK

MR. OTTINGER: Mr. Chairman, distinguished conferees, Secretary Gardner, Governor Rockefeller, honored guests:

While the Governor and I have appeared in disagreement on some aspects of Hudson Valley development in the past, I would like to say I think that is unfortunate, and that I welcome, and always have, the opportunity to join with the State in a joint program for the Hudson Valley.

Any such program is meaningless if we don't achieve pure water, making the Hudson available for recreation, swimming, boating and drinking.

Therefore, the Governor and I find ourselves in total accord with respect to the matters involved in eliminating pollution from the Hudson. With respect to the program that he just enunciated, in all of his four points for increased Federal participation, I endorse his proposals heartily. I think we should increase the

Federal participation substantially.

I testified in favor of his pre-financing proposal before the House Committee on Public Works several months ago. I think the Federal Government should supply a full 30 percent as the Federal share in anti-pollution programs. Indeed, I was the author of the first bill before the Congress that would provide tax incentives to industry to spur them to be able to undertake the tasks of eliminating their pollution.

Our purpose in participating in this conference is an important one. We are here to develop a program to improve and protect the quality of water in the Hudson River. Our task is to undo that which has been done to the once lordly Hudson -- done through ignorance, apathy and selfishness.

Our commitment to abate and control pollution in the Hudson River is essential if we are to return the Hudson to the people as the great resource it once was.

Like so many of our natural resources, we took the Hudson for granted. We abused it and never stopped to think about our continuing dependence on it. As a result, we have been surprised from time to time to discover that we can no longer swim in it, or that the fish no longer bite, or that our boats are covered with oily slime.

This year, when the Northeast's four-year drought reached crisis proportions in the New York metropolitan area, we could not use the Hudson economically, for its waters were too polluted.

I think we have learned our lesson. I am confident that this conference will produce action to rehabilitate our great river. It should be clear that such action must take the form of a coordinated program involving the active cooperation of the Federal, State and local governments, as well as private interests. No one is free of blame for the pollution problem.

Individual communities and industries are dumping raw sewage into the river. Indeed, we are told in New York City alone some 600 million gallons of raw, untreated sewage per day is being dumped into the river.

The State of New York has only recently come to the realization that a crash program is needed to abate pollution and has contributed to the problem by failing to promulgate and enforce effective standards for pollution control.

And, finally, the Federal Government itself must accept a large share of the responsibility. It has not taken steps to ensure that its own installations would not contribute to the pollution problem, and I was shocked to learn that the Veterans Administration Hospital in Montrose, New York, for example, provides only primary treatment of sewage and even that has frequently failed to meet the standards of the Interstate Sanitation Commission. When I questioned the Veterans Administration about this I was told that the Veterans Administration felt it was sufficient to meet only those requirements established by the State Public Health Service. Keep in mind, gentlemen, that we are talking about a hospital where all possible steps to guard against disease should be taken as a matter of routine.

On September 17, I called this situation to the attention of Secretary Gardner and urged him to take steps to prescribe strict standards for water pollution abatement and control by Federal installations, and to see that such standards are met. I am hopeful that this recommendation will be approved by this conference.

But the Federal responsibility does not end there. The Federal Government has a commitment, through legislation enacted by Congress, to assist States and communities in constructing facilities to control pollution. Unfortunately, even the latest legislation -- the Water Quality Act of 1965 -- does not go far enough to make this commitment truly effective.

Governor Rockefeller has recognized the extent of water pollution in New York State and has proposed a comprehensive six-year program to meet this problem. New York State voters will be asked to approve of a billion dollar bond issue to build the sewage treatment plants and intercepting sewers needed now and through 1970.

I join Secretary Gardner and the Governor in giving my unqualified support for this program in urging the voters to vote in favor of this proposition, the one billion dollar bond issue this fall.

Under the legislation recently enacted by Congress, the Federal share of such a program is entirely inadequate. Ceilings on grants are unrealistic. It is like trying to purify a river with one halazone tablet.

I strongly believe that the Federal Government should pay a full 30 percent of water pollution control projects. This should be done, as the Governor requested, in the same manner in which the Federal-aid highway program operates: by making a Federal commitment of 30 percent to be paid over a period of years. This would enable States to use the commitment as credit upon which to finance their clean water programs. The net result would be faster, more effective water pollution abatement at far lower cost to the taxpayer.

I urge this conference to formally request Secretary Gardner to ask for a further revision in the Federal water pollution legislation that will enable us to launch a concerted effort to end pollution rather than the piecemeal approach which has proved ineffective in the past.

If we are to require industries to install expensive anti-pollution devices, we must make sure that in the process we don't make it uneconomic to stay in the State of New York. They will need assistance; they will need encouragement. I therefore introduced the legislation to which I have previously referred, to give them a tax incentive through a fast write-off to be able to accomplish their share in the anti-pollution program.

Finally, this conference must conclude that primary treatment of sewage by communities and industries along the Hudson is not enough to do the job that must be done.

As many of you know, primary treatment merely takes out a portion of the solids, which leaves the water contaminated. Secondary treatment and chlorination of all wastes discharged into the river should be adopted as a minimum requirement. Such a standard must be rigidly enforced.

We can clearly see the need for a uniform standard and strict enforcement. Every Westchester and Putnam County community discharging wastes into the Hudson has primary treatment facilities. But because the Hudson is a tidal estuary, raw and partially treated sewage flows past these communities from such points to the north as Newburgh and from New York City to the south.

Gentlemen, the Hudson is not the only great river stricken by pollution. This conference could result in action that will help establish the Hudson as a model for urban rivers all over our nation.

Let there be no doubt about the extent of interest in and concern for the Hudson. Last January, I introduced a bill to establish a Hudson Highlands National Scenic Riverway -- a mechanism designed to protect and rehabilitate the river and its shores through a cooperative effort involving all levels of government and private interests. This legislation now has 37 co-sponsors in the House of Representatives, including a two-thirds majority of the New York State delegation and all New Jersey Congressmen who are affected. Similar bills were introduced by both New York Senators and one of New Jersey's Senators. Among the co-sponsors are Congressmen from Hawaii, Texas, California, Wisconsin, New Jersey, Ohio, Michigan, Pennsylvania, Wyoming, Florida and Maine.

Rehabilitation of the Hudson is virtually meaningless unless the waters of the river are made pure and drinkable, safe for swimming and boating and recreation.

Our goal is clear.

Let's get on with the job and have it done.

Thank you.

(Applause.)

MR. STEIN: Thank you, Congressman Ottinger, for a very fine and full statement.

I would assure you, sir, that any program we establish will include pollution control for Federal installations, at least as good as the program for industries and municipalities in the area. I think we are under a statutory mandate to have the Federal installations show the way, and we accept our responsibility in that regard.

Are there any questions or comments?

(No response.)

MR. STEIN: If not, at the present time, I would like to call on the representative of Senator Javits of New York, Miss Connell.

Miss Connell.

STATEMENT OF THE HONORABLE JACOB K. JAVITS, UNITED STATES SENATOR FROM THE STATE OF NEW YORK, DELIVERED BY MISS PATRICIA CONNELL

MISS CONNELL: Mr. Chairman:

My name is Patricia Connell and I am Senator Javits' Legislative Counsel.

Because of the religious holiday today, he was unable to attend, and he asked me to come and read his statement for him.

In the interest of saving the time of the distinguished panel, I would like to skip through the statement, reading only occasional paragraphs, and ask that the full text be printed in the record of the hearing.

MR. STEIN: Without objection, that will be done.

MISS CONNELL: Thank you.

"Mr. Chairman, the drought which has plagued the Northeast area of the country during the past summer has had one salutary result. It has served to focus attention in detail on our water needs and resources, and has mobilized public support for efforts to combat

Hon. Jacob K. Javits

the pollution which -- in the New York area, at least -- has robbed us of much of this precious resource.

In its report to the President dated September 7, 1965, the Water Resources Council calls attention to the fact that water quality rather than simply quantity is the real problem in the Northeast, and warns that many of our rivers and streams are already useless, not only for municipal water supply and agricultural purposes, but for industrial and recreational uses as well. The Hudson River is a prime example of this disgraceful condition and is rightfully the subject of this interstate conference.

I join Governor Rockefeller and Dr. Ingraham in welcoming the efforts of the Federal Government in working with the States of New York and New Jersey toward the solution of this problem. But the problem here is not only to make Hudson River water drinkable again, but to restore this river and its banks as the great natural resource it should be for scenic and recreational purposes. To this end, the Governor's Hudson River Commission is exploring steps to preserve the area and revitalize its resources, and a number of Members of the House of Representatives and both Senator Kennedy and I have introduced bills to organize a concerted Federal effort.

Hon. Jacob K. Javits

At a hearing such as this, it would be less than candid to ignore the fact that there is disagreement between the State and the Federal approaches to revitalizing the Hudson. But it would be foolish to allow these conflicting approaches to produce a deadlock; for all resources -- State, Federal and local -- will be necessary to get this job done. The fact that Federal officials of this caliber are here today to explore ways of abating pollution in the Hudson, and that the highest officials of the States of New York and New Jersey are here to testify, is proof that concern extends beyond State boundaries. I hope that it is also a good indication that meaningful intergovernmental action is possible and imminent in restoring the Hudson.

In announcing this conference, Secretary Gardner applauded Governor Rockefeller for the initiative already taken by the State on the problem of Hudson River pollution. He fully and properly endorsed the principle that the primary right and responsibility for abating pollution rests with the States of New York and New Jersey and offered the services of the Department in working toward identifying and seeking solutions to the pollution problem.

As we know, the State of New York Department of

Health has already identified the sources of municipal and industrial pollution on the Hudson and in September 1965 the State initiated legal action against six municipalities which had failed to take abatement action. Further, as soon as a $1 billion bond issue is approved by the electorate in November, New York State will embark on a $1.7 billion water pollution program which will be the most advanced and comprehensive in the Nation.

The assistance of the Federal Government -- both financial and technical -- will be needed to meet this clean water goal, and the enactment only last week of the Federal Water Pollution Control Act of 1965 will provide that much-needed assistance. I am particularly gratified that two amendments which I offered to that bill and which were incorporated into the House version will increase assistance available to our State. One amendment changes the distribution formula so as to give New York a fair share of an additional $50 million a year; the second amendment increases the single project ceiling from $600,000 to $1.2 million.

The report on Pollution of the Hudson River and its Tributaries which was issued by the Public Health Service of the United States Department of Health, Education, and Welfare last week contains some facts and statistics which are both shocking and discouraging. In the area from Troy to the Narrows, for example, the report details 48 discharges of municipal waste directly into the mainstream of the river. In addition, there are 26 discharges into tributaries which directly affect the mainstream. Only six of these 74 municipal discharges received secondary raw sewage into the river.

All five boroughs of the City of New York discharge raw untreated sewage into the river. 38 percent of the waste discharges contaminating the river come from the State of New Jersey and hence affect the New York City portion of the river as well.

There are 53 known discharges of industrial waste into the Hudson or its immediate tributaries from the State of New York alone, and -- surprisingly enough --

the State of New Jersey does not even have available for Federal investigators a list of industrial waste discharges from that State. Federal installations along the river -- and there are 15 such institutions -- contribute 8 million gallons of sewage per day, 6.3 million gallons of which is discharged totally without treatment, contributing 1 percent of the waste discharge into the river. These instances of pollution should, I believe, be of primary interest to this panel.

There is, unquestionably, much work to be done before the Hudson is suitable for recreational use. Making it potable -- as experts now advise as insurance against new water shortages -- is an even more formidable task. But public and official concern for the river has never been higher. This pollution conference can be a model of Federal-State cooperation in the Hudson, and I am pleased to be a part of that effort."

Thank you for your courtesy, Mr. Chairman.

MR. STEIN: Thank you very much, Miss Connell.

(Applause.)

MR. STEIN: You know, Miss Connell, I really don't think that we are going to come up with fundamental Federal-State differences here, at least dealing with the quality of the waters of the Hudson River.

There is one question that has been raised by

State officials here, and in many other States and cities. That is the question of the magnitude of Federal financial assistance.

Obviously, that is a question for the Congress and not for us, but, other than that I am hopeful that we can arrive at unanimous conclusions. We did it in the very difficult case of Lake Erie, and I hope that we can do that here. I really don't look for differences between the Federal and the State officials and the interstate officials on this problem.

Thank you very much.

We would now like to call on the representative of Senator Case of New Jersey, Mr. Kaganowich.

Mr. Kaganowich.

STATEMENT OF THE HONORABLE CLIFFORD P. CASE, UNITED STATES SENATOR FROM THE STATE OF NEW JERSEY, GIVEN BY MR. GAR KAGANOWICH

MR. KAGANOWICH: Mr. Chairman, distinguished members of the panel, ladies and gentlemen:

My name is Gar Kaganowich. I am an Executive Assistant to Senator Clifford Case of New Jersey.

Senator Case regrets that he cannot be with you today. Only the Senate session in Washington prevents him from being here.

He has asked me to read the following statement, and he also asked that the text be printed in the record.

MR. STEIN: Without objection, the full text will be printed in the record.

MR. KAGANOWICH: Thank you very much.

This conference will, I hope, mark the beginning of a massive cooperative effort to restore the Hudson River to its natural beauty and usefulness in the broadest sense.

We must reverse the carelessness and neglect of generations which have marred a majestic natural resource and so contaminated its waters that they are unfit for human beings to drink and are poison to fish and underwater life, which they once sustained so abundantly.

The dimensions of the problem have been dramatically spelled out in a recent report on Hudson River pollution by the United States Public Health Service. According to the Public Health Service, the pollution of 10 million persons is discharged into the Hudson from Albany to the Narrows in New York City. Two-thirds of the waste, Public Health Service advises, originates in New York State, and the remainder in my own State of New Jersey.

About half the waste is discharged into the river without treatment of any kind and another 38 percent receives only primary treatment. According to Public Health Service, 22 Federal installations contribute pollution equivalent to that of 82,000 persons.

The time for words has long since passed.

The water shortage in the Northeast, including New Jersey, has made unmistakably plain the need for cleaning up all the rivers in our region -- the Hudson, the Raritan, the Delaware, and all the others. But to do this will require far greater anti-pollution efforts by all levels of government than heretofore.

Not only government, but most particularly industry, too, has an essential role to play if there is going to be effective enforcement of adequate anti-pollution standards. Clearly, it is going to take a far greater public investment than we have yet made, or even imagined, not only in money but in plain determination and the will to succeed.

It is a challenging task the conference is undertaking. And it is one of inestimable importance for the future of this region. Only our Senate session in Washington prevents me from being with you today.

Thank you.

MR. STEIN: Thank you, Mr. Kaganowich, for an excellent statement.

(Applause.)

MR. STEIN: Are there any questions or comments?

(No response.)

MR. STEIN: If not, is Mr. John W. Logan, the representative of Congressman Resnick, here?

Mr. Logan.

STATEMENT OF THE HONORABLE JOSEPH Y. RESNICK, MEMBER OF CONGRESS FROM THE STATE OF NEW YORK, GIVEN

BY JOHN W. LOGAN

MR. LOGAN: Mr. Chairman, members of the Commission:

Congressman Resnick regrets that he cannot be here today due to the religious holiday, and has asked me to read a very brief statement on his behalf.

I am John Logan, representing Congressman Joseph Y. Resnick, whose district is the 28th of New York, and is the only district lying on both sides of the Hudson River, extending on the shoreline approximately 75 miles east and west.

Both the economic and esthetic values of our district are dependent upon the river.

Our interest is further heightened by the continuing drought.

We believe that no program of pollution control can be divorced from programs of water use. Upon this premise, we believe that the solution is dependent upon

State and Federal cooperation.

I have been encouraged today hearing Secretary Gardner support the State's program of Governor Rockefeller calling for the Federal-State governments to be powerful allies.

I, speaking for one Congressman, am deeply concerned with the Hudson. We pledge our office's continuing commitment to the cause to clean up the Hudson.

Congressman Resnick has pledged his full support of the New York State bond issue for abating water pollution.

Again, thank you for this opportunity to appear before you and to thank the Public Health Service for its leadership in this.

MR. STEIN: Thank you, Mr. Logan.

(Applause.)

MR. STEIN: Are there any questions or comments?

(No response.)

MR. STEIN: At this point, I would like to indicate, as we always like to do, from the Chair, what the schedule will be as far as we see it.

After a short recess, we will expect to call on representatives, commissioners of New York State and New Jersey, whose commitments require them to speak now because of other arrangements.

Then, this afternoon at two o'clock, we have indications that Senator Robert Kennedy will appear before the conference. Tomorrow, at 9:30 a.m., Mayor Wagner will make a statement.

During the forthcoming recess, if there are any other Congressional representatives present, would they come to the table here and make known their representations, so that we may put them on when we reconvene? If not, we will go right into hearing from the New York Commissioners.

We will stand recessed for ten minutes.

(Whereupon a recess was had.)

MR. STEIN: May we reconvene?

The New York State Water Resources Commission is the State public body which conerns itself with all water resources matters. The Chairman of that Commission is the Commissioner of Conservation.

We would like to call next the New York Commissioner of Conservation, Dr. Harold Wilm, who has long been a consultant on national policy and an expert on water resources matters.

Dr. Wilm.

STATEMENT OF DR. HAROLD G. WILM, CONSERVATION COMMISSIONER, CHAIRMAN, NEW YORK STATE WATER RESOURCES COMMISSION

DR. WILM: Thank you, Mr. Stein.

I appreciate the opportunity to be here.

I must say I feel that I am a little bit under a handicap in addressing this audience, or in speaking at all here, because of the very obvious fact that one of my predecessors on the program is my own boss, Governor Rockefeller, who stated our case and the position of New York State in combating pollution with the assistance of the Federal Government, better than I could possibly do.

I am going to be followed sometime later also by Dr. Ingraham, the Commissioner of the Health Department, which has executive powers of enforcing pollution requirements and assisting the communities to put in sewage treatment plants, and so on. These men can speak a lot better than I can, so I am under a real handicap.

As a result, my statement is going to be very short.

As a matter of fact, for a minute I thought Mr. Stein was going to steal part of it, because my main role is to tell of the water resources generally in the State, with relation to State-local government cooperation, and State-Federal cooperation, and not to talk about either the great policies, as the Governor spoke of, or the details of the executive action, which will be Dr. Ingraham's task.

The establishment and attainment of water quality goals are important basic objectives of water resources program. That these activities are well under way in New York has been clearly illustrated by the Governor. The Pure Waters Program and the complementary activities under the accelerated water resources program provide a unique State effort designed not only to clean up the streams, but to insure their conservation and wise management to serve the future.

In this State, we have the legal and administrative framework for effectively handling and coordinating activities and programs relating to all aspects of water resources. Policy-making is centralized in the Water Resources Commission, which is composed of the seven chief executives of the Departments of Agriculture and Markets, Commerce, Conservation, Health, Law, and Public Works, and the Office for Local Government, and four lay advisory members representing agriculture, sportsmen, municipal corporations and industry. With the Conservation Commissioner as Chairman, the Commission draws on the special capabilities and experience of its member departments, each of which has important functions in the water resources field. Further, as the agent of the State, the Commission is especially geared to participate as a partner in Federal-State planning ventures and to call on Federal agencies for assistance in the several water resources studies which the State has initiated. (For example, much of the information which the United States Public Health Service has collected has been obtained through cooperative State efforts.)

This Water Resources Commission is really an interesting executive device, it seems to me, in the sense that it brings together in a panel a group of executives who actually also have command functions, so that we are quite a lot like the way General Eisenhower handled his policy level work in London during World War II. He had generals who were actually line officers also advising him, so that they could determine the strategy among themselves. Then they would go out and execute the strategy.

In this case, in our Water Resources Commission, the member departments execute the major parts of the policies which are developed by the Commission as a whole.

One illustration, of course, of the policy is the fact that the Water Resources Commission reviews and approves all the classifications and standards for the waters of the State, which have been drawn up and recommended by the Health Department.

I believe it is relevant to bring to your attention State planning activities to demonstrate that New York has a complete water resources program within which water quality goals can be established and continually protected. The Water Resources Commission is charged with evolving a statewide plan for the comprehensive development of the State's water resources. To carry out this responsibility, the Commission already is participating in planning endeavors involving nearly one-half of the State's area in:

(1) Federal-State coordinating committee studies, such as in the Susquehanna (there are four of these active at the present time);

(2) Delaware River Basin Commission and other interstate activities.

In this connection, I think it is worth pointing out that the structure of the Water Resources Commission and its chairmanship in the Conservation Commission makes a very effective liaison between the State and local agencies.

The Commission itself consists of four governors and a representative of the President, who was selected to be Secretary Udall. I represent Governor Rockefeller and New York State. This means then that I can bring to the Commission the mature judgment of our six departments and our four lay advisers, and therefore can speak quite authoritatively for the State in the deliberations with the Delaware River Basin Commission and similar agencies.

It puts me in a very fascinating position right now because, by New York State law, Mayor Wagner is the Governor's adviser on the Delaware River Basin Commission. The Commission itself does not have any direct member for New York City, so that I have to be, shall I say, a one-man minority in working towards unanimous decisions which are required of -- this is a familiar phrase to Western people -- one up-basin member, like Colorado and Wyoming, for example, on the Colorado River, and three down-State members of three States below who want to take water from New York State, and the Federal member, who comes from Philadelphia.

Anyway, you can see the interesting job I have in defending Mayor Wagner against the world.

(3) Intrastate regional board studies under Part V, Article V, of the New York State Conservation Law;

(4) intermunicipal water supply planning under Part VA, Article V of the Conservation Law and comprehensive sewage planning studies under the direction of the State Health Department; and

(5) broad-scale water resources studies of ten regions of the State with the State Office for Regional Development in cooperation with the Federal Housing and Home Finance Agency.

On August 25th, Governor Rockefeller directed the Water Resources Commission to speed up planning activities to provide for the maximum use and development of our existing water resources, especially for municipal water supply and distribution, giving top priority to the needs of the Hudson Valley, including New York City. The Commission now has this task underway.

In planning the development of the water resources of New York State, one of the things is that wherever we need to draw water, it will be clean water.

Dr. Harold G. Wilm

In other words, we are counting very firmly on the passage of the Governor's Pure Water Program and upon a greatly accelerated action program to clean up our waters.

The plan for any river basin study will include provisions (if determined to be practicable and feasible) to meet short and long-range needs to satisfy diverse water requirements: municipal, industrial and agricultural water supply; water quality management, including low-flow augmentation; water-based recreation; fish and wildlife enhancement and management; navigation; hydroelectric power; erosion and sedimentation control; related land use and land treatment; and others. Estimates of the benefits to be derived from the varied project functions will be developed for various alternative schemes. All practicable, alternative means of solving the major water resources problems of the region are being studied to determine the most economical and advantageous solutions. Water quality management, including pollution control, is a basic consideration in the evaluation of the possible solutions.

We believe that without the cooperation of the local people, at every stage of the complex planning process, efforts to conserve, control, utilize, develop, and manage the water resources of a region or a river basin are likely to fall short of the end objectives. The regional basin board provides the "grass-roots" local participation that is necessary in this region to achieve successful integrated planning. Realistic comprehensive planning provides the only means to guarantee that once the needed water quality is achieved, it can be protected. Water quality goals appropriate for the many necessary and desired uses are basic for our economic and social well-being and require consideration of many aspects which clearly are beyond the area of health alone. We have available and in operation in New York not only the mechanism, but actual programs under local leadership, participation and financing to achieve these goals.

These intrastate regional board studies are now in progress in three river basins of the State; others are in prospect. In all these, as well as those of interstate river basins of concern to New York, we welcome the participation of Federal agencies, including the United States Public Health Service, as collaborators with the State in planning the use, control and development of the waters of the State. We believe that Congress has clearly established the need for this teamwork and that water quality goals in any area of study can be established realistically only when local, State and Federal agencies work together to insure collaborative consideration of all significant interests.

It may be worth mentioning here that I think it may be almost unprecedented in the Federal-State relationship picture that now with these regional boards under the leadership of the State Water Resources Commission, a regional board such as that on the Erie-Niagara region, the four western counties of the State are asking for assistance from the Federal agencies in drawing up their own local water development plans.

The Secretary of Agriculture wrote us, in response to our inquiry, that he does have statutory authorization to cooperate with our regional boards, as well as with the State directly; whereas the Chief of Engineers informed us that at the time we talked with them they did not have statutory powers, and therefore, with their consultation and help, Congressman O'Brien and Senator Javits introduced a little language into the Rivers and Harbors Act this year which does authorize the Corps of Engineers for the first time, to assist a local government entity, even smaller than a State, by supplying manpower and their resources in any amounts needed to help develop a regional plan.

I think this is a wonderful example of the growth of State responsibility. This is very, very large, strong praise to us, the growth of State responsibility, in participating directly and actively with local government on the one hand, and the Federal Government on the other. It means we aren't always just asking for either leadership or handouts from Uncle Sam.

We do need Federal funds for flood control, navigation and water pollution control, and so forth. The complete financing of such things is beyond our power, but since we do expect to put a very substantial amount of investment of money and time and intelligence and experience into these plans, we want to participate.

The State presentation will provide details on the planning activities of the Water Resources Commission and staff will be available to provide further information and answer any questions the conferees may have.

Thank you very much.

(Applause.)

MR. STEIN: Thank you, Dr. Wilm, for a very excellent and comprehensive statement, as usual.

I think we can all see why Dr. Wilm is considered by the people in the field to be one of the Nation's foremost water resources experts.

Are there any questions or comments?

(No response.)

MR. STEIN: The New York State Department of Health is the official State water pollution control agency. Directly charged with the responsibility for carrying out the water pollution control program is the Commissioner of Health, Dr. Hollis Ingraham, whom we would like to call on now.

Dr. Ingraham.

STATEMENT OF DR. HOLLIS S. INGRAHAM, COMMISSIONER, NEW YORK STATE DEPARTMENT OF HEALTH

DR. INGRAHAM: Mr. Stein, members of the conference, ladies and gentlemen:

I am Hollis S. Ingraham, Commissioner of Health of the State of New York.

As Commissioner Wilm has noted, water resources policy is formulated in New York State by the Water Resources Commission, of which he is Chairman, and of which the Department is a member.

Water pollution control is, however, the responsibility of the State Health Department. In the lower Hudson, we work in close cooperation with the Interstate Sanitation Commission, of which Mr. Tom Glenn is Director and Chief Engineer, and a member of this conference.

I am here today to discuss with you the condition of the Hudson River, and to describe the corrective actions we are taking to redeem this vital water course.

During the past year my Department completed a gigantic task as part of the State's water pollution control program. We surveyed every river and stream, and there are 70,000 miles of them in New York, and every lake, reservoir and pond, and there are 3.5 million acres of them. Consequently, we are aware of all of the sources of pollution in this State, and that includes every city, village, town, business or government installation that may be polluting the 250-mile length of the Hudson.

We are working to abate pollution from 74 communities which pour wastes directly into the Hudson or its tributaries. We are determined to end the industrial contamination that spews from over 50 firms into the river, from paper plants, steel mills, food processors, and chemical manufacturers, to name a few.

The evidence of pollution compiled by the

U. S. Public Health Service and introduced into these proceedings is well known to us and, as has been indicated, the State Health Department is the principal source of this information. We also know what must be done to restore the full, aesthetic, recreational and practical uses of the river.

Let me cover quickly some of these actions that we already are carrying out. I mentioned that we have surveyed New York's 54,000 square miles of surface waters. By the end of this year we will have all these waters classified as to their best use or, rather, it will be done by the Water Resources Commission. We will also have completed pollution abatement plans for all of them by the end of the year. No community or industry can add a new discharge into a body of water like the Hudson until the Health Department determines that wastes from this new source will be adequately treated. In this way we have been able to prevent additional contamination.

But the nagging problem is the existing backlog of polluters. We have continually exercised the Department's enforcement powers in the past against polluters. But these powers have been hobbled by delaying devices in the law which enabled a polluter to hold us off for years. Fortunately, these roadblocks have been swept away as part of the recently enacted Pure Waters Program which the Governor described. We are now armed with swifter and surer legal powers, and we are working quickly to take enforcement measures against known polluters. We began scheduling hearings the day the new provisions of the law became effective, on September 1st of this year. We will be holding 100 hearings against polluters within six months. Thirty-four have already been scheduled, and twenty-one of these deal with industrial and community polluters of the Hudson or its tributaries. Eight hearings have already been held in the past week.

Our legal power to enforce pollution abatement is the stick we hold over the polluter. But we are also appealing to his nobler instincts with an attractive carrot. The carrot is, of course, the construction grants feature of the Pure Waters Program and the tax incentives for business which the Governor also described. Laying interceptor sewers and building a modern sewage treatment plant mean a heavy outlay for any community.

Take a city of 50,000 population. A sewage treatment plant and the required trunk lines for it would cost about $2.8 million today. If the voters approve Proposition One, the Pure Waters Bond Issue, we will then be able to give that community 30 percent State aid and, if necessary, advance the full 30 percent Federal share. This would cut the direct cost to the community from $2.8 million to a little over $1 million. This is still no trifling sum for a city of 50,000, but the difference between paying only 40 percent and paying the full cost is, we believe, the decisive edge in getting our communities to build these facilities.

These then are the two principal levers in our pollution abatement program -- enforcement and financial assistance. We are already using one: our legal powers. We hope soon to be able to use the more palatable lever of aid, if our people elect for pure waters on November 2.

Our Health Department water resources program is also embarked on other efforts that contribute to cleaner waters. We have, for example, some difficult and exotic wastes to deal with in this State. Consequently, we are spending about $120,000 on waste treatment research; on matters like detergent breakdown, grease accumulations, algae nutrients and troublesome chicken wastes. We wholly support comprehensive sewage treatment planning studies, and seven such studies are in process along the Hudson corridor at a cost of $1.3 million. We are in the process of installing two pilot stations in our automated water quality monitoring system. When it is complete, seven such stations will be measuring the quality of the Hudson and will report its condition instantly to our central office. We are also recognizing that even after the initial high investment in a treatment plant a great deal must be spent to operate it. Consequently, there is included $8 million in this year's budget which we will pay out to communities with effective treatment plants to cover one-third of the cost of operating these facilities.

These then are some of the measures we are taking in New York. These are all parts of the Governor's Pure Waters Program of aid, and represent a bold confrontation of the pollution problem that could profitably be followed in the rest of the Nation.

We feel that our hope for victory is advanced further by the growing interest of the Federal Government in ending pollution. That interest is demonstrated in the conference called today by the Department of Health, Education, and Welfare at the request of Governors Rockefeller and Hughes. When he announced this conference, Secretary Gardner said that the Department of Health, Education, and Welfare's intention is to lend every assistance possible to help State and local governments deal with the menace of pollution.

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Governor Rockefeller has stated with great force that our primary need from the Federal Government is for a more equitable share of Federal aid. The Governor also expressed our desire to continue profiting from the excellent consultant services of the U. S. Public Health Service. I want to underscore our desire to continue this relationship. The State Health Department and the U. S. Public Health Service have a long record of close and productive relations. This relationship has grown, I believe, out of mutual respect. For our part, we hold the Public Health Service in the highest esteem. We look to it for guidance and counsel as we seek to lift the scourge of water pollution from out State.

Let me describe some of the areas where we look for leadership from the Federal Government. First, we would like to see the numerous water resource programs of the Federal Government better coordinated, perhaps through some arrangement in the Department of Health, Education, and Welfare. Right now there are seven Federal agencies active in New York State in water programs of one sort or another -- the Public Health Service, the Corps of Engineers, the Soil Conservation Service, the U. S. Geological Survey, the Federal Power Commission, the U. S. Coast Guard, and the Department of the Interior. One of my staff engineers estimated there are 500 Federal personnel, approximately, working in New York in water programs, sometimes in concert, occasionally in conflict, and sometimes in competition.

Next we hope to see continuing emphasis on the research aspects of pollution such as the promising work going on at the Taft Center in Ohio. We look for cheaper and more effective treatment methods to emerge from these investigations and to learn some of the answers to handling some of the more difficult wastes we have to treat in New York State. We are particularly interested in solving the problem of storm water overflow so common among the older cities that line the Hudson. We are eager for answers to the treatment of discharges from vessels which add to the Hudson pollution problem. We look forward to rapid progress and useful results from the study the Public Health Service announced it would make some months ago into maximizing the uses of the Hudson. We hope to have close cooperative arrangements between the Federal monitoring system and the automated system we are installing in our own waters.

Finally, we expect the passage of the Pure Waters Bond Issue will surely increase the number of localities applying for Federal as well as State aid. Consequently, we ask that the Department of Health, Education, and Welfare increase the staff of its construction grants section so that these applications will be processed with dispatch and thus allow us to get on quickly with the task of restoring our waters.

These are all-important contributions that the Federal Government can make to help us help ourselves to cleaner waters. Given New York's firm resolve to end pollution, given the technical support of Federal water experts, and above all given a full share of Federal assistance, we will overcome pollution in New York and point the way to cleaner waters in the rest of the Nation.

Thank you.

(Applause.)

MR. STEIN: Thank you, Dr. Ingraham, for a very full statement of New York's views.

Are there any questions or comments?

(No response.)

MR. STEIN: If not, at the present time, because of commitments and busy schedules, we would like to switch to New Jersey and call upon the Health Officer of New Jersey, Dr. Roscoe Kandle.

Dr. Kandle.

STATEMENT OF DR. ROSCOE P. KANDLE, CONFEREE AND COMMISSIONER, NEW JERSEY STATE DEPARTMENT OF HEALTH

DR. KANDLE: Good morning, friends.

New Jersey shares with New York and the Interstate Sanitation Commission responsibility for the control of the pollution of the interstate Hudson River in the northeastern New Jersey-New York City metropolitan area. The responsibilities and jurisdiction of the State Department of Health in New Jersey are established by Chapter 12 of Title 58 of the Revised Statutes of New Jersey. The New Jersey State Department of Health, the agency of

State government responsible for stream pollution control in New Jersey, and the Interstate Sanitation Commission, may act unilaterally or in concert in relation to problems of stream pollution control within their respective jurisdictions. Both unilateral and joint actions by these two agencies of government have been exercised on many occasions.

The New Jersey State Department of Health has required primary treatment as a minimum for domestic sewage effluents discharged directly into the interstate waters of the Hudson River and its tributaries. Primary treatment plants in this area of New Jersey are in operation at Edgewater, North Bergen, West New York, Hoboken, Jersey City, Kearny and the Passaic Valley Sewerage Commission. The volume of waste waters being treated at these plants is approximately three hundred million gallons daily, of which two-thirds is discharged by the Passaic Valley Sewerage Commission. The only untreated domestic wastes discharged from New Jersey in this area are discharged from the City of Newark into the Newark Bay. This situation is being eliminated by the construction of a new intercepting sewer which will discharge into the facilities of the Passaic Valley Sewerage Commission, as noted on page 29 of the Report prepared by the Department of Health, Education, and Welfare for this conference. It is contemplated that this project will be completed early in the summer of 1966. The construction work is well under way at this time, and by latest estimates it is at least 35% completed.

The New Jersey State Department of Health under date of April 27, 1965, notified the owners of treatment plants discharging effluents from New Jersey into the interstate Hudson River waters that effective chlorination of these effluents is to be required not later than May 15, 1967.

The New Jersey State Department of Health is in the process of classifying the various streams of the State, and establishing through such classification, water quality criteria. These classifications generally are being established by "Regulations Establishing Certain Classifications to be Assigned to the Waters of This State and Standards of Quality to be Maintained in Waters so Classified." These became effective September 1, 1965, and a copy thereof is attached to my statement.

The classification of the waters of the Raritan River Basin has been completed. A formal hearing has been held on the proposed classification of the Hackensack River Basin. Since discussions in relation to the interstate

Hudson River could have some bearing upon the contemplated classification of the waters of the Hackensack River Basin, promulgation has been deferred temporarily. The Interstate Committee working in conjunction with the New Jersey State Department of Health and the State Department of Conservation and Economic Development has completed a draft of recommendations for classification of the New Jersey portion of the Hudson River and its tributaries. These recommendations also may be subject to further discussion and amendment as a result of our discussions here at this conference. A hearing will be scheduled soon in order to complete the classification of the interstate waters of the Hudson River. The classification, of course, will determine the degree of wastewater treatment required. The New Jersey State Department of Health has the authority and is prepared to require secondary treatment in this situation as soon as the classification of the waters has been determined by this mechanism and has indicated the need for secondary treatment.

The treatment plants discharging from New Jersey into the interstate Hudson River represent a capital investment by the municipalities involved of approximately $90 million. The Passaic Valley Sewerage Commission, I emphasize, is supported by the municipalities. Amortization charges have been not less than $40 million, for a total cost of at least $130 million. Federal construction grants made through the offices of the Public Health Service for projects in this area have amounted to approximately $1-1/2 million, less than 2% of the initial capital investment, without considering the heavy debt, caused by the present method of financing these facilities.

Ladies and gentlemen, it is local government which achieves pollution abatement, essentially with its own money. Until this method of financing major pollution abatement and control projects is changed, progress undoubtedly will continue to be slow no matter what hearings and legal actions the Federal Government takes. Substantial Federal and State funds are needed for further progress. New Jersey has made a start by providing $1 million for grants and interest-free loans for engineering plans for inter-municipal, stream valley, or regional sewerage systems. The development of stream valley systems is a major issue in New Jersey.

New Jersey does not believe that the proposed timetable, as recorded in the conference report prepared by the Department of Health, Education, and Welfare, the recommended high standards of dissolved oxygen and coliform counts for presumably all parts of the river, and the suggested equivalent of the most efficiently built and operated secondary treatment plants, are consistent each to the other.

The estimated cost in New Jersey of full secondary treatment would be in excess of one hundred million dollars. Whether the recommended oxygen standards can be met with the load on these waters, which increases every day, even with secondary treatment, seems doubtful.

New Jersey is anxious to achieve maximum use of the waters of the Hudson River. Scientific data taking into account a wide range of factors and technological problems, including health, conservation, water policy and uses and industrial processes, are urgently needed and are the critical issue in the further control of the pollution of these waters.

I join Dr. Ingraham in his emphasis on research. I believe that research and treatment methods, and water reclamation methods are at least as crucial as money. In my opinion, we desperately need a major breakthrough in treatment methods and water reclamation. The New Jersey State Department of Health intends to continue its active stream pollution control program in collaboration with and in cooperation with the Interstate Sanitation Commission and other agencies of government having an interest and jurisdiction in this area.

This is the end of my statement, Mr. Stein, but I want to make a few other points. I want to make the point especially that the State Department of Health has been working closely with the Sewerage Commissioners, and that plans have been developed to meet the major problems.

I shall now present a statement of the Commissioners. This is a statement of the Passaic Valley Sewerage Commissioners, and it is signed by James J. McMahon, Chairman.

MR. STEIN: Pardon me. Dr. Kandle, before you go on with that, you did have certain attachments to your statement.

DR. KANDLE: I would like those to appear in the record.

MR. STEIN: Without objection, that will be done.

DR. KANDLE: Thank you.

(The attachments referred to are as follows:

RULES AND REGULATIONS

* * *

REGULATIONS ESTABLISHING CERTAIN CLASSIFICATIONS TO BE ASSIGNED TO THE WATERS OF THIS STATE AND STANDARDS OF QUALITY TO BE MAINTAINED IN WATERS SO CLASSIFIED.

WHEREAS, Chapter 12 of Title 58 of the Revised Statutes of New Jersey (N.J.S.A. 58:12-3) provides that no plant for the treatment of domestic or industrial wastes or other polluting substance, from which the effluent is to flow into any of the waters of this State, shall be constructed except under such conditions as shall be approved by the State Department of Health, and

WHEREAS, The conservation of the quality and function of the waters of the streams of this State into which effluents from sewerage facilities are discharged and the minimizing of pollution of these waters is the over-riding consideration of the Department of Health of the State of New Jersey in its considerations of the approvals of designs for such treatment works, and

WHEREAS, The maintenance of reasonable quality of the waters of the streams of this State is the primary basis upon which the State Department of Health approves of the design of proposed sewerage facilities, and

WHEREAS, The Interdepartmental Committee on Stream Pollution Control Problems, established by the State Commissioners of Health and Conservation and Economic Development, on April 9, 1964, recommended certain classifications be assigned to the waters of this State and standards of quality to be maintained in waters so classified, be promulgated as regulations by the State Department of Health, and

WHEREAS, The State Department of Health has determined that classifications of the waters of this State and standards of quality to be maintained in such waters as proposed and recommended by the Interdepartmental Committee on Stream Pollution Problems in this State are reasonable and constitute a valuable administrative instrument to the Department in the administration of the New Jersey Stream Pollution Control Program,

NOW THEREFORE, The State Department of Health, pursuant to authority vested in it, promulgated the following regulations establishing certain classifications to be assigned the waters of this State and standards of quality to be maintained in such waters which are to be implemented from time to time by further regulations promulgated after public hearing defining the water or waters of this State to be assigned certain classifications and standards of quality to be maintained in such waters.

Dr. Roscoe P. Kandle

NEW JERSEY STATE DEPARTMENT OF HEALTH

Roscoe P. Kandle, M. D.
State Commissioner of Health

Filed with Secretary of State: August 10, 1964
Effective Date: September 1, 1964

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REGULATIONS ESTABLISHING CERTAIN CLASSIFICATIONS TO BE ASSIGNED TO THE WATERS OF THIS STATE AND STANDARDS OF QUALITY TO BE MAINTAINED IN WATERS SO CLASSIFIED.

Fresh Waters

The fresh non-tidal surface waters of the State are herein classified as Classes FW-1, FW-2, FW-3 and FW-4. For each classification there follow definitions and stream quality criteria.

Class FW-1

Definition: Fresh surface waters designated by authorized State agencies as being set aside for posterity to represent the natural aquatic environment and its associated biota.

Criteria

These waters shall be maintained, as to quality, in their natural state.

Class FW-2

Definition: Fresh surface waters approved as sources of public potable water supply. These waters are to be suitable for public potable water supply after such treatment as shall be required by the State Department of Health. These waters shall be suitable also for all recreational purposes including fishing, the propagation of native fish species desired for angling and other fish and aquatic life necessary thereto as well as any other reasonable uses.

Criteria

Conditions	Allowable Limits
1. Floating solids, settleable solids, oil, grease, artificial coloring matter and turbidity.	None of which are noticeable in the water or are deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota.
2. Toxic or deleterious substances (including mineral acids, caustic alkali, cyanides, heavy metals, carbon dioxide, ammonia or ammonium compounds, chlorine, etc.)	None which would affect humans or be detrimental to the natural aquatic biota.
3. Odor and taste producing substances.	None which are offensive to humans, detrimental to the aquatic biota or capable of producing offensive tastes and/or odors in water supplies and fauna used for human consumption.
4. pH.	Between 6.5 and 8.5 unless naturally outside thereof.
5. Dissolved oxygen.	Not less than 5.0 p.p.m. for trout waters; otherwise 4.0 p.p.m.

6. Thermal discharges	None which detrimentally affect the natural aquatic biota, or reasonably anticipated reuse of the waters.

Class FW-3

Definition: Fresh surface waters suitable for all purposes provided for under Class FW-2 except public potable water supply.

Criteria

Conditions	Allowable Limits
1. Floating solids, settleable solids, oil, grease and turbidity	None which are noticeable in the water or are deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota.

2. Toxic or deleterious substances (including mineral acids, caustic alkali, cyanides, heavy metals, carbon dioxide, ammonia or ammonium compounds, chlorine, etc.)	None which would affect humans or be detrimental to the natural aquatic biota.
3. Color, odor and taste producing substances.	None which are offensive to humans, detrimental to the aquatic biota or capable of producing offensive tastes and/or odors in fauna used for human consumption.
4. pH.	Between 6.5 and 8.5 unless naturally outside thereof.
5. Dissolved oxygen.	Not less than 5.0 p.p.m. for trout waters; otherwise 4.0 p.p.m.
6. Thermal discharges.	None which detrimentally affect the natural aquatic biota, or reasonably anticipated reuse of the waters.

Class FW-4

Definition: Fresh surface waters except as provided for under Classes FW-1, FW-2 and FW-3. These waters are to have limited recreational value and ordinarily not be acceptable for bathing or fishing but shall be able to maintain some fish life even though they may not be suitable for the propagation of fish. These waters shall not be an odor nuisance and shall not cause damage to pleasure craft having occasion to traverse the waters.

Criteria

Conditions	Allowable Limits
1. Floating solids, settleable solids, oil and grease	None which are noticeable in the water or contribute to the formation of sludge deposits along the shores.
2. Toxic and deleterious substances.	None in such concentrations as to cause fish mortality or inhibit their natural migration.

3. Taste and odor producing substances.	None which shall be offensive or that would detrimentally affect finfish, shellfish or other aquatic life in higher quality receiving waters. Neither shall it inhibit the natural migration of fish.
4. Dissolved Oxygen.	Not less than 50% saturation.

Tidal Waters

The tidal surface waters of the State, including interstate waters, are herein classified as Classes TW-1, TW-2, and TW-3. For each classification there follow definitions and stream quality criteria.

Class TW-1

Definition: Tidal surface waters suitable for all recreational purposes, as a source of public potable water supply where permitted, and, where shellfishing is permitted, to be suitable for such purposes.

Criteria

Conditions	Allowable Limits
1. Floating solids, settleable solids, oil, grease, sleek and turbidity.	None which are noticeable in the water or are deposited along the shore or on the aquatic substrata in quantities detrimental to the natural biota.
2. Toxic or deleterious substances (including mineral acids, caustic alkali, cyanides, heavy metals, carbon dioxide, ammonia, or ammonium compounds, chlorine, etc.)	None which would affect humans or be detrimental to the natural aquatic biota.
3. Color, odor and taste producing substances.	None which are offensive to humans, detrimental to the aquatic biota or capable of producing offensive tastes and/or

	odors in water supplies and fauna used for human consumption.
4. pH.	Between 6.5 and 8.5 unless naturally outside thereof.
5. Dissolved Oxygen.	Not less than 50% of saturation.
6. Thermal discharges.	None which detrimentally affect the natural aquatic biota, or reasonable anticipated reuse of the waters.
7. Coliform bacteria.	The median MPN value in shellfish growing areas shall not be in excess of 70 per 100 milliliters.

Class TW-2

Definition: Tidal surface waters having limited recreational value and ordinarily not acceptable for bathing or fishing but suitable for fish survival, although perhaps not suitable for fish propagation.

Dr. Roscoe P. Kandle

These waters shall not be an odor nuisance and shall not cause damage to pleasure craft having occasion to traverse the waters.

Criteria

Conditions	Allowable Limits
1. Floating solids, oil and grease.	None which are noticeable in the water or contribute to the formation of sludge deposits along the shores.
2. Toxic and deleterious substances.	None in such concentrations as to cause fish mortality or inhibit their natural migration.
3. Taste and odor producing substances.	None which shall be offensive or that would detrimentally affect finfish, shellfish, or other aquatic life in higher quality receiving waters.

4. pH.	Between 6.5 and 8.5, unless naturally outside thereof.
5. Dissolved Oxygen.	Not less than 50% saturation.
6. Thermal discharges.	None which detrimentally affect reasonably anticipated reuse of the waters.

Class TW-3

Definition: Tidal surface waters used primarily for navigation, not recreation. These waters, although not expected to be used for fishing, shall provide for fish survival. These waters shall not be an odor nuisance and shall not cause damage to pleasure craft traversing them.

Dr. Roscoe P. Kandle

Criteria

Conditions	Allowable Limits
1. Floating solids, settleable solids, oil and grease.	None which are noticeable in the water or contribute to the formation of sludge deposits along the shores.
2. Toxic and deleterious substances.	None in such concentrations as to cause fish mortality or inhibit their natural migration.
3. Taste and odor producing substances.	None which shall be offensive or that would detrimentally affect finfish, shellfish or other aquatic life in higher quality waters.
4. pH.	Between 6.5 and 8.5 unless naturally outside thereof.

5. Dissolved Oxygen.	Not less than 30% of saturation or 3.0 p.p.m., whichever is less.

Coastal Waters

The surf waters of the Atlantic Ocean are classified as Class CW-1.

Class CW-1

Definition: Ocean surf waters expected to be suitable for recreational use.

Criteria

Conditions	Allowable Limits
1. Floating solids, settleable solids, grease and turbidity.	None of which are noticeable in the water or contribute to the formation of sludge deposits along the shores.
2. Toxic and deleterious substances.	None which would affect humans or be detrimental to the natural aquatic biota.

3. Color, taste and odor producing substances.	None which are offensive to humans, detrimental to aquatic biota or capable of producing offensive tastes and/or odors in fauna used for human consumption.)

* * *

DR. KANDLE: Now, this is the statement of the Passaic Valley Sewerage Commissioners.

The Passaic Valley Sewerage Commissioners operate a treatment plant located in the City of Newark giving primary treatment to sewage from 29 municipalities in northern New Jersey, serving four counties, with a population of approximately 2,000,000 people. In addition, the Commissioners act as a policing agent to enforce water pollution control regulations in the Passaic River below the Great Falls and its tributaries. To this end, the Commissioners not only sample the streams, but sample the effluent from many other treatment plants within this drainage area, in order to see that water pollution is kept under control. In doing its job, the Commissioners investigate hundreds of pollution reports per year, and to that end thousands of analyses per year are made in its laboratory. Through its efforts, the Commissioners are proud to say that any pollution emanating within the Commissioners' jurisdiction has been controlled effectively, and last year despite the drought, which reduced the flow to a mere trickle at many points, the water in the Commissioners' section of the Passaic River and its tributaries was maintained in a satisfactory condition.

The treatment plant owned and operated by the Commissioners is a primary treatment plant, which has been continuously in operation since October 1924. The Commissioners were pioneers in the authority or regional type of sewage system handling in this country. After primary treatment, the effluent is discharged into the upper New York Bay, through a dispersal field, which covers three and a half acres. Unfortunately, last year the outfall pipes leading to the dispersal field were crushed by the tanker S. S. Trojan, thus preventing the effluent from reaching the proper dispersal point. The effect of this was that the effluent, instead of being dispersed over a large area, was forcefully ejected through the broken pipes at one location, which did not give the surrounding waters time to assimilate the effluent. Thus the Commissioners realize a temporary nuisance may have been caused. However, the Commissioners have let a contract in the amount of $474,950 to Spearin, Preston & Burrows, Inc., to repair these outfall pipes. Repair is expected to be completed by the spring of 1966.

The Commissioners also realize that although their treatment plant may have been satisfactory when first built, that improvements are desired as more knowledge in the field is available. The Commissioners, to this end, have expended approximately $12,000,000 since 1954.

The Commissioners also realize that further improvements are desired. For example, at present, there is a limit in the quantity of sludge which can be retained by the Commissioners before its tanks are filled, causing a lowering of treatment efficiency. And, although when the sludge barge is available and is not being held up by foul weather, this storage would be sufficient for good treatment, in practice, it has been found that too often, due to weather or other obstacles, the removal of sludge by the barge is obstructed, and, therefore, treatment at that time deteriorates. The Commissioners, in order to improve this situation, have plans and specifications for the building of additional sludge handling facilities, at a cost of approximately $1,400,000.

The Commissioners at present will also begin studying the feasibility of chlorinating its effluent during the period of time, each year, from May 15 to September 15, in order to improve any effect of its discharge in the surrounding waters.

The above summary is given to show that the Commissioners, in the past, have never been ones to shirk their duties, and, in fact, have been generally ahead of the surrounding area in any forward progress. Yet, despite this, or maybe because of this, the Commissioners have received little Federal money to aid them in their endeavors. Although the Commissioners have made many applications in the past for Federal aid during the expenditure of the $12,000,000, they have received only $250,000 in grant from the Government. Of the $1,400,000 expected to be expended on the sludge-handling facilities, the Commissioners had made applications dating back to November 13, 1962, for aid on this project. If aid had been granted then, this project might well be completed.

If other treatment plants in the area chlorinate their effluent, the Commissioners will do likewise.

Limited only by the funds available, the

Commissioners, as in the past, will continue to maintain standards of treatment consistent with the norms prevailing in the waters affected by their discharge.

Thank you.

MR. STEIN: Thank you, sir.

(Applause.)

MR. STEIN: Thank you very much.

Are there any comments or questions?

(No response.)

MR. STEIN: Doctor -- and I mean this to sharpen up the issue and develop the issue -- with reference to the Passaic Valley Sewerage Commissioners' statement which you delivered for someone else -- I don't know whether you can answer the question, but, as I understand it, they are providing primary treatment. The second point is that the problem with the effluent is indicated in this statement to be caused by the crushing of outfall pipes by a tanker.

As I understand our technical people, their contention is that the discharge, even before the tanker crushed the pipes, was unsatisfactory, except that it was coming up at three points, and now it looks like it is all boiling up at one.

Perhaps this will come out in the discussion, but I think in the development of this, the people from New Jersey should have time to think about this. They possibly want to provide an answer for the record if it comes up, because I hope we can resolve that problem, which may be a significant one, whether primary treatment and chlorination is enough, or whether secondary treatment is required, and whether just a repair to the existing broken outfall which will go back to previous conditions, will be satisfactory.

I don't know the answer.

DR. KANDLE: I would like to make a point, Mr. Stein, if I may, that I was dealing in my own statement with the series of events which are going to determine the degree of treatment of the New Jersey plants, including the Passaic Valley Sewerage Commissioners.

The procedure that we are using is that we are going through the classification method and thereby establishing the needs. Whatever the results of that are, they will apply to the Passaic Valley Sewerage Commissioners, as well as all the others, so this is a solution.

If there was an implication that the repair of the outfall was the only thing, that was certainly not my intention.

MR. STEIN: Thank you very much, sir.

Are there any other comments or questions?

(No response.)

MR. STEIN: If not, I think that Dr. Ingraham pointed out that sometimes we Federal agencies work in concert. In our usual custom, I understand we have scheduled a major meeting in Philadelphia that Dr. Kandle and perhaps several others will have to attend.

In order to make this a working conference, the next speaker will be called out of order, because he has been invited to this meeting too.

Talking about Federal cooperation, we once had a very able young man working for us doing our enforcement work up in the New York Region. He was both a lawyer and an engineer, and we thought we were set for the next few years. However, we cooperated so much that now Nassau County has him handling their water and sewerage. Maybe that's carrying cooperation a little too far, but we love to cooperate with the State and local agencies.

We would like to call on Mr. Eugene Nickerson, the Nassau County Executive, at this point.

Mr. Nickerson.

STATEMENT OF EUGENE H. NICKERSON, NASSAU COUNTY EXECUTIVE, NASSAU COUNTY, NEW YORK

MR. NICKERSON: Thank you very much, Mr. Stein.

I would like to thank the conference, including Mr. Stein, for this opportunity to express my views on the urgent problem of the pollution of the Hudson River.

As a matter of simple geography, Nassau County does not border upon the Hudson. But the citizens of Nassau County -- there are almost a million and a half -- whom I represent today, have a vital stake in the fate of the Hudson and in the purposes of this conference.

We are concerned, of course, with decisions on both the Federal and State level which affect the conservation and restoration of this beautiful and valuable waterway. It was for this reason that I testified before the National Parks and Recreation Subcommittee of the House of Representatives in support of the Hudson Highlands Scenic Riverway bill, sponsored by Representative Ottinger.

The Hudson River is of great importance to us as a recreation area, a fish and wildlife preserve, and -- with better planning and management than we have witnessed thus far -- it can be a monument to man's ability to appreciate and protect the gifts bestowed upon him by nature. Without planning and without action I think we all recognize the Hudson River will be -- as it is today -- a shameful illustration of neglect and disrespect for those precious gifts.

More importantly, we share with New York City, with the counties bordering the Hudson, and with the State of New Jersey, an overriding interest in the Hudson River as a future source of water supply.

We do not have a water emergency in Nassau County at present, but we do not intend to court disaster by resting on our good fortune. Our future, we feel, is intimately linked with the metropolitan region and with the Hudson Valley Basin.

The normal average precipitation in Nassau County is about 44 inches per year. During the three-year drought period we have lost 10 inches annually, reducing our water table by five and one-half feet. If the current trend continues, we will receive approximately 30 inches of rain in 1965, the lowest in history.

Expert studies have concluded that Nassau's water supply would be adequate to meet increasing public and industrial needs for fifteen years. But, if the drought continues at its present rate, the line between consumption and supply could cross as soon as 1970. The safety of our citizens demands that in our planning we must not make optimistic assumptions about the rainfall.

This conference underlines the fact that no county, no region, no governmental unit, can separate its needs and responsibilities from those of its neighbors. Unless this concept is fully recognized today and acted upon in the coming months, we will all find ourselves in the midst of "water wars," which will serve the interest of no one.

Should New York City in the future find it necessary to call upon all its water resources in Nassau County -- and they do have wells in our county -- and should we be faced with a drought in the future, we would have to look elsewhere to supplement our own ground water. The spectre of what happened in Brooklyn 35 years ago, when over-pumping and resultant salt water intrusion ruined the water supply, would loom in Nassau County, despite all the progress we are making in working to prevent such an occurrence.

A comprehensive water planning report, prepared for us by the expert consulting firm of Greeley & Hansen, gave some consideration to future development of "upland sources." Surely the Hudson River, where 8 billion gallons of water currently run out to sea each day, must be looked upon as a primary possibility.

Desalination will not solve all the problems. Even the most sanguine estimates on the cost of desalting have a rockbottom of 30 cents per thousand gallons -- four times the money which Philadelphia is spending for treatment of river water. And this 30 cent estimate covers only the cost of conversion, not delivery.

Therefore, all of us at this conference have equal reason to be more than disturbed by what has happened to the Hudson, and in taking action toward its restoration we must consider why it has reached its present state of pollution.

Of course, there is a necessity, in my opinion, for interstate and regional cooperation in making use of the Hudson's interstate waters. But interstate cooperation, Federal assistance, regional planning for joint utilities -- none of these would absolve the State of New York from enforcing its own water pollution laws.

Spokesmen for New York State testified before Congress only last February that our water pollution control program is "effective." I suggest that if this were so, this conference would not be taking place today.

What must have been meant by that statement is simply that there are effective laws on the books. Any layman who has watched the deterioration of the Hudson River knows that those laws have not been translated into effective action.

In fact, the Governor was frank in admitting to the House Committee on Public Works that steps taken by the State "have not been effective in getting the action which is essential."

Yet we have had a water pollution law in New York State, further strengthened by legislation in the past session of the State Legislature, which has been in effect for sixteen years. The provisions for enforcement have been in the statute books. The concern for action has been lacking.

I might add that under a more recent provision, the 1962 Public Health Law 1263-c, the State was authorized to contribute one-third of the cost for operation and maintenance of sewage treatment plants, which would have given Nassau County -- our county -- $400,000 for this purpose in 1964, and a similar amount for the current year. It was only this year that the State sought appropriations under a law which was three years old. No use whatsoever had been made of this law in prior budgets.

At this late date, Federal assistance is essential. It is shameful that for so long the State has neglected its responsibilities. This is an expensive and tragic object lesson. Federal assistance should be reserved for projects which a State is unable to do, not one which it neglects to do.

Only this year a letter to me from the State Administration guaranteed that the State could provide sixty percent aid to local communities for water treatment, when in fact that "guaranty" depended on the possibility of Federal aid.

The State's interest in the problem of water pollution has been consistently half-hearted. Only recently, with increased public concern -- when the danger point had already been reached -- the State responded, rather than led the way. I would suggest that in a matter which is so fundamental to the safety and welfare of its citizens, the State should be first -- not the last -- to fully recognize the problem and act upon it.

Enforcement of water pollution control by the present State Administration has been conspicuously lax. For an enlightening comparison one may look to the era of Governor Lehman, when the laws were weaker, the problem was less acute, and yet enforcement was far stricter.

There have been actions brought against a few small municipalities, but nowhere has there been any enforcement against industrial water pollution. The State claims that it is reluctant to impose financial burdens on industries at the risk of driving them out of the State. Yet it was not until this year that the Governor began to think about tax incentives for industrial participation in pollution control.

Certainly, we cannot blame industries alone when they have not been apprised by the State of their violations. Many violators have never had a complaint brought to them, except by irate citizens' groups.

There are countless instances of industries in other States where enforcement of pollution control has resulted in industrial compliance and the industry has not moved.

There should be Federal standards on water use and water pollution to eliminate the relevance of industrial competition between States. But it is no answer to our problems in New York State to allow our waters to become polluted in order not to offend industry, any more than we should lower our wage standards to those of some other States.

Industry should be assisted by government in pollution control, but it should also consider the public interest as part of its normal expenditures. Commendably, many industries in New York State have done this on a voluntary basis. I might add that control of water pollution is certainly in the interest of industry as well. Not only would a severe water crisis endanger industry, but I am told that for some industries at present the waters of the Hudson are so polluted that they must be purified several times for industrial use -- not for drinking water.

All of us are gratified by the Governor's report to this conference today on the recent step-up in pollution hearings and of plans for more effective enforcement during the coming year. Water pollution controls were further tightened by the State Legislature this year and we are hopeful that swift State action will enforce these provisions.

Historically, New York has been the leader in conservation, not the follower. I think we should regain this role and I wish that it had been possible for Mr. Stein to come to New York to learn from us, not to study what our State has done wrong. I am hopeful that our great State will move to justify his confidence in the future.

Eugene H. Nickerson

Thank you.

(Applause.)

MR. STEIN: Thank you, Mr. Nickerson.

Are there any comments or questions?

(No response.)

MR. STEIN: If not, we will stand recessed until two o'clock.

(Whereupon, at 12:05 p.m., a luncheon recess was taken.)

AFTERNOON SESSION

(2:00 p.m.)

MR. STEIN: May we reconvene?

Let me give you our plan for at least starting this afternoon.

There are several representatives of Federal agencies who will be called upon, and they have relatively short statements. If and when Senator Kennedy arrives, of course we will put him on as soon as possible.

With that, we will call on Mr. Anderson to call on the Federal representatives.

Mr. Anderson.

MR. ANDERSON: I would like to call first on Mr. Mark Abelson, Section Field Representative from the Department of the Interior.

Mr. Abelson.

STATEMENT OF MARK ABELSON, NORTHEAST REGIONAL COORDINATOR, UNITED STATES DEPARTMENT OF THE INTERIOR

MR. ABELSON: Mr. Chairman, conferees, ladies and gentlemen:

I am Mark Abelson, Northeast Regional Coordinator, Department of the Interior. Interior's Regional Coordinators are part of the staff of the Office of the Secretary. My statement will therefore reflect the concerns and interests of the whole Department in the matter you are here to consider.

Not many years ago we thought about our natural resources -- one at a time, with each one pretty well insulated from all others. That way of thinking and that framework of policies has proved to be sadly inadequate.

Possibly more than any other agency of the Federal Government, the Department of the Interior finds itself involved in situations where the utilization of one natural resource is resulting in serious damage, or even in the destruction, of some other resource or resources. Destruction of fish and wildlife by certain types of land use, or water pollution, is an old story. Hard-headed people were often heard to say, "That's just the price that must be paid for progress." But such an answer is beginning to wear extremely thin -- especially when the so-called price of progress begins to involve large numbers of people and their day-to-day existence.

Writing in the current issue of The Scientific

American, now on the newsstands, Professor Abel Wolman, the well-known authority on sanitary engineering, says:

> "It is ironic that New York City which houses the nation's (if not the world's) greatest concentration of managerial talent, should be running short of water while billions of gallons of fresh water flow past it to the sea."

Strong language, like Professor Wolman's, is indicative that we are beginning to understand the social costs of water and air pollution, of indiscriminate use of lethal chemical pesticides, and of that drab ugliness that characterizes so much of our cities and open countryside. We are just beginning to understand that conservation of natural resources requires concern with our total environment -- not simply for that part of it which troubles us momentarily.

I want, therefore, to emphasize, Mr. Chairman, that the pollution problem of the interstate waters of the Hudson River is only one symptom of more general environmental deterioration. Obviously, there is more than one problem to cope with. And, paradoxically, we won't get very impressive results in dealing with that one problem until we see it in a total environmental framework.

I am not saying we can do nothing about water pollution until we attack all its related problems. I am saying that a fully successful attack on water pollution requires concurrent attack on all fronts of environmental deterioration. This was the central theme of President Johnson's Message on The Natural Beauty of Our Country. In other words, the beautification of America is going to involve a vast amount of very grubby and dirty clean-up work, not only of water, but elsewhere. And it is going to cost a substantial amount of money -- both private and public.

Extent of Hudson River Pollution

Turning now to the specific subject of this conference, pollution of the Hudson River and its main tributary, the Mohawk, extends from Utica, New York, to Sandy Hook, New Jersey. Localities affected include the cities along the Mohawk River, the New York State Capitol area on the Hudson, communities along the length of the Hudson River itself, and the greater New York City area.

The Bureau of Outdoor Recreation notes that pollution creates many serious problems regarding management of outdoor recreation resources and activities in the area we are discussing. For example, swimming, one of

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America's most popular outdoor recreation activities, is either curtailed or else completely eliminated on the Hudson from Glen Falls, New York, south to Staten Island.

In the 1920's, public bathing areas on the Hudson at New York City were plentiful. They do not exist today. Beaches administered by the Palisades Interstate Park Commission at Alpine, New Jersey, and at Haverstraw and Nyack, New York, are restricted solely to sunbathing.

Another outdoor recreation activity of considerable significance on the Hudson River is pleasure boating. At present, one can travel by boat from New York City via the Hudson and Mohawk north or west to the St. Lawrence River, to Lake Ontario, to Lake Erie, or to several of the Finger Lakes of central New York, and via the Hudson to the Lake George-Lake Champlain waterways.

A most attractive added feature in connection with such boating is the possibility of overnight camping along the river, or on one of its many islands. However, more often than not, stench from the river makes this impossible.

Even driving for pleasure -- most popular of all recreation activities -- is adversely affected, where highways and river closely parallel each other, by the appearance as well as by the odor of the Hudson in its present state of pollution.

Fish and Wildlife

Use of streams for massive waste disposal is a luxury we can no longer afford. The needs of our expanding population require that we practice multiple-use of each of our resources. Pollution prevents multiple-use of streams and public indignation about pollution is growing.

If the insistent demand for sport fishing is to be satisfied, many urban areas must turn to the rivers on which they are located. It is clear that we must plan to utilize such bodies of water to their optimum potential for production of fish and aquatic wildlife. This is particularly important in rivers and streams which have anadromous fish runs.

Anticipated demand for sport fishing can be shown by comparing the surface acres of fresh water now available with what may be expected. According to the Outdoor Recreation Resources Review Commission Report entitled "Sport Fishing Today and Tomorrow," the area available in New York in 1960 was 0.09 acres for each

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resident. By the year 2000, that will be reduced almost 50 percent. New Jersey had 0.002 acres per person in 1960; it will probably have half of that in the year 2000.

By the year 2000, there will probably be a threefold increase in number of sport fishermen over that of 1960. According to the Fish and Wildlife Service, the number of fishermen continues to increase at a faster rate than the general population.

The potential of the Hudson River for satisfying some of these demands is enormous. With improved water quality, it could easily sustain several times the existing sport fishing and commercial fishing pressure. Few comparable opportunities to provide new fishing areas could be found in the entire Nation.

One very serious effect of pollution is that it inhibits utilization of the fish populations which do exist. The Hudson River serves as a prime example. It supports brown bullhead, carp, alewife, white perch, striped bass, American shad, American eel, sturgeon, and some other species. But throughout its entire length it receives light fishing pressure in relation to its potential. Fishermen avoid waters known to be polluted. A common complaint is that the flesh of Hudson River fish is tainted and most people object to the "oily" taste.

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One badly polluted area is found below Albany. That pollution frequently results in a reach where dissolved oxygen is so depleted that no fish can survive or even pass through. Usually this pollution block is found near Castleton, during late summer or early fall. Other localized areas of pollution, serious enough to affect fish life, are found along the river.

One thing we are certain about is that adult shad and striped bass have to run a gauntlet of pollution on their way to and from the spawning grounds; juveniles must also run the same gauntlet to reach coastal waters.

The commercial fishery of the Hudson River has been declining over a period of many years. The two most important species are the striped bass and American shad; however, other species such as alewives, carp, catfish, American eel, sturgeon, and white perch are taken commercially. The 1964 commercial catch was the poorest ever recorded and the 1965 catch may be even less. The total commercial catch, including all species, amounted to 275,000 pounds, valued at $45,000. This compares with a total catch of 949,000 pounds, having a value of $129,000 in 1960.

Hydrologic Information

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The Department of the Interior has been engaged for many years in the collection of hydrologic information in the Hudson River Basin. These data include stream discharge, sediment discharge, chemical quality of both surface water and ground water, and area reports on ground water occurrence and availability.

The Geological Survey (Water Resources Division), at the present time, is operating 60 stream-discharge stations in the Hudson River Basin, Of these, 34 are in the area downstream from the head of tidewater at Troy. Some stations have been in operation since 1902.

The most recent addition to the Hudson River stream-gauging network is at Poughkeepsie. This new station will provide a continuous record of the movement of water upstream in response to high tides, of the movement of water downstream in response to low tides, and of fresh water inflow above Poughkeepsie. Discharge data so provided are essential in any studies of pollution or of the fresh water supply potential of the river in that vicinity. Installation and operation is being financed jointly by the Department of the Interior and the New York State Division of Water Resources.

Three conductivity recorders -- one each at Poughkeepsie, Beacon, and Peekskill, are currently being installed. Data from these stations, supplemented by other measurements, will be utilized to determine the relationship of the position of the salt-water front to the fresh-water discharge.

Ground-water investigations made by the Geological Survey, in cooperation with the New York Water Resources Commission, have resulted in published reports on all of the central and lower parts of the basin except Orange and Ulster Counties. A ground-water investigation in those two is now nearing completion.

Where go from here?

I have now indicated some of the things we know about the adverse effects of water pollution in the Hudson River and some of the types of hydrologic information which has systematically been collected by the Department of the Interior. In the next minute or two, I would like to return to the opening theme of this statement. But now is the time to ask, "What should be the future of the great rivers of America?"

In his Message on The Natural Beauty of Our Country of last February, President Johnson directed the Secretary of the Interior to assume leadership in cooperative efforts to develop a plan which will make the Potomac River a "conservation model" for the Nation. That job is going forward. In the same Message, the President said:

> "I hope action here (on the Potomac) will stimulate and inspire similar efforts by State and local governments on other urban rivers and waterfronts, such as the Hudson in New York. They are potentially the greatest single source of pleasure for those who live in most of our metropolitan areas."

The Administration is sponsoring legislative proposals for the establishment of a National Wild Rivers System, including part of the upper Hudson. Numerous bills have been introduced in the Congress to establish a Hudson Highlands National Scenic Riverway. Hearings on these bills were held in New York State this summer. The State of New York has established a Hudson River Valley Commission to develop plans and recommendations for the best protection and preservation of the Hudson River for its present and future use and enjoyment. These are further indications of the urgent need to clean up the Hudson and make it once more a river that bears some true resemblance to the stream Hendrick Hudson sailed in his ship Half Moon.

Thank you.

(Applause.)

MR. STEIN: Thank you, Mr. Abelson.

Are there any questions or comments?

(No response.)

MR. STEIN: This, by the way, is one of the major other Federal water resources agencies we coordinate with.

As you can see, water is a very complicated subject, and many, many of the Federal agencies have a deep interest in water -- no deeper, I might say, than the Department of the Interior, as you have heard from Mr. Abelson.

Mr. Anderson.

MR. ANDERSON: The District Engineer for the Corps of Engineers would like to present a statement, but before calling on the Colonel, I would like to introduce Brigadier General David S. Parker, Division Engineer, North Atlantic Division, Corps of Engineers.

It's nice to have you with us, General. Thank you.

I call now on Colonel R. T. Batson, who will present a statement for the Corps of Engineers.

STATEMENT OF COLONEL R. T. BATSON,
DISTRICT ENGINEER, UNITED STATES
ARMY ENGINEER DISTRICT, NEW YORK

COLONEL BATSON: Mr. Stein, ladies and gentlemen:

I certainly agree that the subject of water is a complicated one. I would like to review it from the standpoint of the Department of the Army.

The New York District, in its civil functions, has responsibilities for the area of New York and New Jersey, which involves the Hudson River and streams flowing into the Port of New York. As a dual function, I am also designated Supervisor of the New York Harbor. This relates to functions which are associated with navigation.

I would like to describe briefly the role of the Department of the Army as it relates to the problem of the pollution of the Hudson River.

This role of the Corps of Engineers stems from historic responsibilities in the development and preservation of water resources of the nation.

The most general law associated with pollution, enforced by the Corps of Engineers, is Section 13 of the Rivers and Harbors Act of 3 March 1899. This law in essence states that it is unlawful to throw, discharge or deposit any refuse matter of any kind or description into navigable waters of the United States. You will note that water pollution in its broadest interpretation is not unlawful under the statute, but only the deposit of refuse material which is injurious to navigation. Also, specifically excluded from the definition of refuse in the Act is matter "flowing from streets and sewers and passing therefrom in a liquid state." These distinctions limit the role of the Corps of Engineers in the prevention of pollution.

Since 1952, by an Act of Congress of 1888, as amended, I, as the Supervisor of New York Harbor, seek to prevent obstructive and injurious deposits in the tidal water of the Harbor of New York, or its adjacent or tributary waters, or those of Long Island Sound. The prohibited materials covered by this statute are described more specifically as refuse, dirt, ashes, cinders, mud, sand, dredgings, sludge, acid, or any other material of any kind other than that flowing from streets, sewers, and passing therefrom in liquid state.

Incidentally, in association with these duties we designate the dumping areas outside of the harbor for these kinds of materials.

By the Federal Oil Pollution Act of 1924, the discharge of oil of any kind, or in any form, including fuel oil, oil sludge and oil refuse into tidal navigable waters of the United States from vessels is prohibited. This statute is enforced by the Corps of Engineers, as well as by the Coast Guard and other Federal agencies.

Although the role of the Corps of Engineers in the prevention of pollution is limited, as noted previously, to that linked with navigation, there is one instance where the District Engineer is assigned a specific responsibility with regard to the discharge of sewage into the harbor. Under a stipulation of the Supreme Court of the United States, the District Engineer is called upon to monitor the discharge of the Passaic Valley Sewer into the Upper New York Bay. Since 1952, this activity has been performed with the cooperation of the Interstate Sanitation Commission.

To enforce these statutes, the New York District operates four patrol vessels and seven patrol cars. When a violation is observed or reported, we inform the violator of the statute that he is violating and solicit compliance. If correction is not effected within a reasonable time, a report is forwarded to the appropriate United States Attorney or the Admiralty and Shipping Section of the United States Department of Justice, with a request that legal action be taken against the offender. From July 1964 to July 1965, we conducted 878 investigations. During this period, fines paid to the Department of Justice by violators amounted to $45,600.

This figure is only significant when you realize that the fines are generally in the area of $500 to $1,000. Since January 1965, the costs to waterfront users in eliminating violations, as reported to us, has amounted to $1-½ million.

Under Congressional authority, funds have been made available to the District for the collection and removal of drift. Several Corps of Engineers' vessels are used to collect and dispose of floatable material and debris. Most of the collection activity is in the upper bay of the harbor, where drift collects from the contributing waterways. The collected material is burned on incinerator barges anchored in the Upper New York Bay off Robbins Reef.

Pursuant to a Congressional resolution, the District is now engaged in a study to determine the feasibility of eliminating the sources of drift and debris by removal and disposal of dilapidated structures and derelicts along the shores of New York Harbor and its immediate tributary waters. Removal of the dilapidated structures and derelicts would eliminate a source of organic pollution from the harbor waters and the Lower Hudson River. This study, which is expected to be completed early next year, is being coordinated with local and Federal agencies, including the United States Public Health Service.

In connection with sedimentation studies of the lower Hudson River, the Corps of Engineers has constructed a comprehensive model of the New York Harbor, including the Hudson River as far north as Hyde Park. This model at the United States Waterway Experiment Station at Vicksburg, Mississippi, is being preserved as a permanent tool for use in studies of New York Harbor.

With reference to Table 9 of the Department of Health, Education, and Welfare Report of discussion, the Troy Lock and Dam and storehouse at Albany are the only Corps of Engineers facilities on the Hudson River, operated by the New York District. The storehouse is to be abandoned and this function of our operation will be transferred to new facilities at the Troy Lock and Dam, where, in turn, a collector system will shortly be designed to carry discharges from the control house at the lock to the municipal system.

As District Engineer, I am also associated with military construction, and primarily the Department of the Army installations. For other Army installations along the Hudson River, Department of the Defense policy is to program the construction of sewage treatment plants to stop untreated sanitary discharges into the river.

The Corps of Engineers will continue to cooperate with the agencies represented here in controlling pollution to the extent of its authority.

Thank you.

MR. STEIN: Thank you, Colonel.

(Applause.)

MR. STEIN: Are there any comments or questions?

FROM THE FLOOR: Mr. Stein, I would like to ask the representative of the Department of the Army, what is the time-table for the West Point area?

MR. STEIN: We are not accepting questions from the floor, but what is the time-table?

COLONEL BATSON: Colonel Fannell is probably better prepared to answer that question than I. Is he here now?

(No response.)

COLONEL BATSON: I talked to him this morning concerning it. We have had problems in the past in the Department of the Army concerning getting appropriations for both the primary and secondary treatment plants. I am sure that this matter of secondary treatment will be re-analyzed, and I hope we can obtain the necessary funds to complete this action.

I think General Parker would like to say a few words on this point also.

MR. STEIN: General?

STATEMENT OF BRIGADIER GENERAL DAVID S. PARKER, DIVISION ENGINEER, NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS, UNITED STATES ARMY

GENERAL PARKER: I would merely like to confirm Colonel Batson's statement. I spoke to West Point this morning. West Point simply felt that it is ahead of the rest of the communities on the Hudson, and, with the steps taken now, I am sure the West Point program of secondary treatment will be undertaken. I am sure we will have some success with that.

MR. STEIN: Thank you very much, General.

I think several things seem to be pointed out here.

1. You heard Colonel Batson speak about these locks and dams. You know we keep a close surveillance on Federal discharge points where we are dealing with locks and dams, which may just have two or four or five people, but we still are providing treatment.

Again, up to now, many of the Federal installations, including the Department of Defense, have indicated that they would keep up, so to speak, with what the communities around them are doing. Sometimes we hope that the Federal agencies will exert leadership, but I do think that if there is a recommendation from the conferees, I can assure you, from the Federal Government, that the Federal installations will be in a position to comply with these recommendations on or before the time the other communities in the area comply with them.

I think I can say that with a fair amount of confidence, because the Department of Defense and the Corps of Engineers is indeed our sister agency in water pollution control. Both the Corps of Engineers and we go before the same committees in the House of Representatives and the Senate of the United States for authorizations and general legislation.

The same people who enact water pollution control legislation deal with rivers and harbors and the Corps of Engineers projects, and the committee has unanimously indicated that they are in full sympathy with this program.

I am sure that the Department of Defense installations will keep apace.

Are there any further questions or comments?

(No response.)

MR. STEIN: If not, at this time we are honored and privileged to welcome that intrepid sailor who went out on the not always clean waters of the Hudson River, the distinguished Senator from New York, Mr. Robert Kennedy, who has been one of the stalwarts in the fight against pollution.

You heard the Secretary say this morning that he had been in office scarcely an hour before Senator Kennedy called him about the pollution situation in the Hudson.

I may say for myself, I don't think that a day has passed when either Mr. Kuh or I have been in Washington that we have not had a call asking us what we were doing. I think one of the prime movers to get pollution cleaned up in the Hudson River today is Senator Kennedy.

(Applause.)

STATEMENT OF THE HONORABLE ROBERT F. KENNEDY, UNITED STATES SENATOR FROM THE STATE OF NEW YORK

SENATOR KENNEDY: Mr. Chairman, members of the conference:

I am pleased to have the opportunity to appear at this conference to discuss the pollution of the Hudson River, for no other environmental problem is more important to the citizens of New York City, northern New Jersey, and the Hudson River Valley. Today the Hudson River is little better than an open sewer; its condition reflects on those of us who live on its banks.

In requesting Secretary Gardner to convene this conference and in asking Governors Hughes and Rockefeller to join me in this request, it was my hope that this occasion would be a turning point in a long history of abuse of the Hudson. This conference offers an opportunity to learn the facts about this pollution, to discuss them, and to agree to a program of corrective action. I hope that all of you attending this conference will join in pursuit of this goal.

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I would like to take this opportunity to thank Secretary Gardner for responding to my request. I would also like to thank Governor Rockefeller and his staff for their cooperation in preparing for this conference. I hope that the results of our discussions here help resolve his earlier doubts about the value of these proceedings.

I would also like to thank the Chairman, Mr. Murray Stein, and his associates for their effort in preparing the report on the pollution of the Hudson. Mr. Stein's schedule of hearings this year has been arduous, from Lake Erie in June and August to the Red River of the North in North Dakota last week. Without the effective spadework of the Public Health Service, this conference could not be held.

It is high time that we examine the increasing contamination of the Hudson River. In the more than 300 years that we have lived on its banks, we have fouled it to a point that staggers the imagination.

When our ancestors first saw the banks of the Hudson in 1609 they found a land that was rich in natural resources. Daniel Denton, writing of the Hudson and the surrounding area in 1670 said, "The country itself sends forth such a fragrant smell, that it may be perceived at Sea before they can make the land." This is not the smell that greets today's ship passengers, as Mr. Stein and some of the rest of you know so well.

During the Revolutionary War thirsty soldiers drank from the Hudson as they traveled along its banks. Today a hiker can still drink from some of the streams feeding its headwaters. But last summer several young boys died as a result of eating a watermelon they pulled out of the river.

Our parents and grandparents sailed their boats on the Hudson or took pleasure cruises up the river. Today medical authorities seriously question whether it is safe to travel in a small boat on many sections of the river or in any way expose themselves to its germ-laden spray.

The sources of this pollution are known. It is incredible that in the latter half of the Twentieth Century many cities in New York State and New Jersey discharge raw sewage into the Hudson. To list only a few of these communities, I can point to:

City:	People:
Cohoes	20,129
Troy	67,492
Rensselaer	10,506
Hudson	11,075
Newburgh	32,000
Bronx-Riverdale	30,000
Northern Manhattan	40,000

Manhattan-West Wide	671,000
Lower East River Manhattan (East Side) Brooklyn	2,200,000
Red Hook	130,000
Newark Bay-Petty Ditch	170,000

In all, more than 4,000,000 people discharge raw sewage into the Hudson. Only a small proportion of the communities along the Hudson give their sewage the secondary treatment generally recommended by sanitation authorities.

Our industries also discharge chemicals, food and fiber processing wastes and other pollutants that add to the load of filth that the Hudson must carry. It should be remembered that a single plant can generate pollution equivalent to that coming from a large city.

You do not need a degree in sanitary engineering to know that the Hudson is polluted. But it would take an expert chemist to analyze the many pollutants that are found in a glass of water when it reaches the harbor.

Looking beyond the immediate problem, it takes little imagination to realize what will happen to the Hudson during the remaining 35 years of this century unless we change our practices. We can expect the population along the banks of the river to double in the next twenty years.

Unless we build adequate waste treatment facilities no communities will be able to draw on the Hudson for their water, no striped bass will spawn in the Hudson, and the river will be a menace to the health of those who live near it.

In a larger sense the contamination of the Hudson is typical of many of the waterways of our country. Although we tend to think of pollution as a problem of the large industrial cities located on a few rivers such as the Merrimack, the Housatonic, the Detroit, or the Buffalo, it is also a problem in less developed areas such as the Red River of the North in North Dakota and the Salt River Valley in Arizona. These communities are now facing the same water contamination experienced in the East.

The Conference of State Sanitary Engineers estimated that there are 1,342 communities in the Nation with a population of 11.3 million that discharge untreated waste in their waterways. They also estimate that 16.8 million people discharge inadequately treated waste into their rivers. This estimate is probably conservative in that they estimate total needs for New York State to cost $252,000,000 as contrasted with the State's more recent estimate of $1.7 billion. It is no wonder that one water expert stated that the United States has sanitation systems that are forty years out of date.

Many reasons account for the sad state of our waterways today.

No one city or village controls waste disposal practices on nearby rivers or lakes. These communities have followed traditional methods of waste disposal that may have been satisfactory in the 19th Century, but are certainly not adequate today. Streams that in the past were able to carry away village wastes are now burdened with the refuse from a community that has grown several times in size; and the result is all too easy to see.

In other cases, in prosperous times communities have installed sewer facilities that were satisfactory in the past but do not meet today's standards. Some of these communities suffer from unemployment, yet are now faced with construction costs that they find difficult to meet.

New industrial processes developed during the 20th Century have contributed to the waste loads that our rivers must carry. In the East, industry is the major user of water. Personal use is relatively small when compared with the amounts of water used for industrial cooling, cleaning and processing. Unfortunately, this use has not been accompanied by the development of treatment processes that prevent these wastes from being thrown back into the river.

Enforcement of pollution regulations by State authorities has often been lax because of a fear that an industry would move to another State. Attempts to control pollution at the State level has been hampered by the fact that many of our major waterways cross State boundaries. Different standards of control and administration of these controls makes rational planning of sewage disposal facilities difficult for communities and industries near State borders. For example, it would certainly be foolish for New York City to require secondary treatment of its municipal sewage if northern New Jersey were not to do the same.

Our States have been primarily responsible for control of water pollution. They have issued regulations governing the level of treatment required of a community or an industry. However, the record of action is not a good one. In New York State, the Health Department has established standards for its waterways, stating that a river or lake should be kept clean enough to swim in or could be used for the disposal of industrial waste; but these standards have not been enforced. It is only within the last month, for example, in five and ten-minute hearings that the cities of Troy and Cohoes have been ordered to enforce State water pollution regulations. As recently as one year ago, New York State had only one mobile water pollution investigation team that could investigate specific complaints. Yet only evidence from this team was acceptable in the courts.

In addition, New York State's records of industrial pollution cannot tell us whether any cleanup of municipal sewage will be wasted effort because of the level of industrial pollution. For one industrial plant can generate as much pollution as a large city, even though it discharges a relatively small volume of waste.

The Federal Government has provided assistance in the past to those smaller communities that have been unable to bear the full costs of new sewage disposal facilities. Present water pollution control law authorizes a total of $100 million a year for use in construction of municipal funds and Area Redevelopment funds have also been available to assist in meeting these costs. A total of $38,960,144 of Federal funds have been given to New York State for this purpose so far.

But there has been a reluctance on the part of Congress and the Executive Branch to increase the Federal contribution because they do not believe that current State pollution laws are either enforced or are adequate for the job.

This Congress has considered S. 4, a bill to amend the Federal Water Pollution Control effort. Partially as a result of my efforts, the Federal contribution has been increased from $100 million a year to $150 million a year. Previous limitations on the size of Federal grants have been removed for the additional $50 million. This will make it possible for our larger cities to obtain Federal assistance.

With the funds available in this bill, New York State should be able to meet its needs in the first year of the pollution control program. For New York State can qualify for a major share of the additional $50 million. It will take some time for each community to prepare its plans for sewage treatment facilities.

Hon. Robert F. Kennedy

As I understand it, Mr. Chairman, even now New York State has only made a request of some two and a half or two and three-quarter million dollars for this purpose under this bill, so the State and these various communities will have to develop programs and take action before any requests can be granted.

At least, for the time being, for the programs that have been outlined and are being developed, this money is available and sufficient to meet the problems that are being faced. However, it will not be sufficient if we develop a comprehensive program, as we should here in New York State, and put it into effect.

In addition, a separate Water Pollution Control Administration has been established to conduct research on water pollution problems, administer the Federal grant program, and to help the States work out interstate water problems. The most important feature of the bill is the provision that requires each State to establish water quality standards acceptable to the Public Health Service for interstate waters. Despite the opposition of some States, including New York, this provision was passed. Communities and industries located on interstate waterways can now plan national water pollution control programs.

Hon. Robert F. Kennedy

I am sure that many of you will be glad to learn that S. 4 is expected to be signed into law this week.

But S. 4 is not enough. We need a Federal contribution of as much as $1 billion a year. And in order to use this money effectively, we need nationwide water pollution standards. Without these standards, our control programs will be ineffective and no rational planner would recommend a large investment in treatment facilities.

I intend to recommend legislation in the coming session of Congress to provide national standards for the control of water pollution. I plan to couple additional grant money for the construction of municipal sewage facilities with these standards.

And I will propose rapid amortization provisions for those industries that construct facilities to abate their pollution. With a program of this type, I believe that we can move forward in the job of ridding our waterways of pollution.

This program will require cooperation and leadership on the part of municipal and State leaders. With this leadership we can restore the beauty of our rivers and lakes. For we will be judged by our successors according to our works and the conditions in which we live.

We owe it to succeeding generations to clean up the magnificent Hudson River.

Thank you, Mr. Chairman.

MR. STEIN: Thank you very much, Senator.

(Applause.)

MR. STEIN: Are there any comments or questions?

(No response.)

MR. STEIN: I think we do have one point, but this may very well be a minor one.

Senator, you pointed out the backlog of Federal projects from New York, which I should indicate are well within the scope certainly of our staff to handle.

One of the recommendations made this morning is that we should augment the Federal staff in order to handle the flood of applications.

If I put these two statements together, we have a little time to augment that staff, unless the applications are going to come in.

SENATOR KENNEDY: Yes, by some of the approachments of the State.

We have had talk about what we need in the way of money from the Federal Government, and we need a larger staff to handle the problems.

Hon. Robert F. Kennedy

The fact is, as I pointed out, that up until last month little effort really has been made at the State level. I pointed out that in two communities where something has been done just since our meeting up in Buffalo on Lake Erie -- one meeting, I understand, lasted six minutes and the other meeting lasted about eight minutes -- so steps have to be taken at the State level, standards established, and then those standards enforced in all of the communities across the State.

Until that is done, I think that the Federal Government is going to be reluctant to put much more money into this program.

I am hopeful that with the statements that have been made by the spokesmen of the State over the period of the last couple of months, that we are moving now in the right direction, with the idea that there has to be cooperation and there has to be a program established at the State level.

We can't expect, once again, that Federal money is going to solve these problems. We have to understand that they must be done at the State and local levels. The Federal Government can help, but we are waiting obviously for the State to meet their area of responsibility.

MR. STEIN: Thank you, Senator.

We have received word from the White House -- and this may have been while you were coming up, sir, that the new Federal Water Pollution Control Bill amendment is planned to be signed this Friday at 9:45 a.m., so that will be done this week, I suspect.

Senator Kennedy. Yes.

MR. STEIN: Thank you very much.

SENATOR KENNEDY: Fine.

(Applause.)

MR. STEIN: May we call on Mr. Anderson again, please?

MR. ANDERSON: We have a representative from the Department of Commerce, Mr. Richard Greening from the Weather Bureau, who will present a statement.

MR. STEIN: May I ask those coming up with statements to see if they can supply the reporter and the conferees with copies of their statements, if you have extra copies.

STATEMENT OF RICHARD M. GREENING, REGIONAL HYDROLOGIST, WEATHER BUREAU, REGIONAL OFFICE, ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION, NEW YORK, N.Y.

MR. GREENING: I am Richard Greening, Regional Hydrologist with the Weather Bureau Regional Office at Kennedy Airport, and I have a statement for the Environmental Science Services Administration.

The establishment within the Commerce Department of the Environmental Science Services Administration (ESSA) on July 13 of this year consolidated the activities of the Weather Bureau and the Coast and Geodetic Survey. The Secretary of Commerce, early in October, will transfer to the new ESSA the Central Radio Propagation Laboratory of the National Bureau of Standards. This consolidation of Federal activities under a single Administrator makes possible more efficient investigations of our environment; comprehensive investigations that consider the atmosphere, the hydrosphere, the lithosphere as interacting parts of man's whole environment. Thus, ESSA will within one agency be concerned with activities ranging from the center of the earth to the sun, and will provide a central focus for efforts to improve man's understanding of his environment.

Among the general functions of ESSA:

a. Observe and collect comprehensive data about the state of the oceans and inland waters, of the upper and lower atmosphere . . . and of the solid earth;

b. Communicate, correlate, process, and analyze all such environmental data;

c. Provide and disseminate information about the state of the oceans and inland waters, of the upper and lower atmosphere . . . and of the solid earth, and predictions of their future states;

d. Operate and maintain a system for the storage, retrieval and dissemination of data relating to the state of the oceans and inland waters . . . and of the solid earth;

e. Perform related research and development.

There already exists within ESSA facilities and competence to proceed with these functions.

It is the policy of ESSA to assist in the national effort to ameliorate pollution in man's total environment. To this end ESSA will conduct vigorous and imaginative forward looking programs in the measurement, archiving, analysis and prediction of environmental parameters affecting, or affected by, pollution. Documentation and evaluation of the effects of pollution on the geochemistry and geophysics of our environment are of great importance and programs in this area will be specially emphasized.

It is the policy of ESSA to encourage cooperative programs with other agencies. ESSA is keenly aware of the need of many agencies for specialized research, observations and prediction of environmental parameters to support their own programs in pollution evaluation and abatement, and ESSA will participate in such programs whenever possible.

The Weather Bureau arm of ESSA provides the nation's river and flood forecast and warning service. Designed historically to provide only flood warnings, this system, over the years, has demonstrated the potential capability to serve virtually all aspects of water management including pollution control. As a by-product of the Weather Bureau's national river and flood forecasting service, there has evolved an increasing use of daily stage and streamflow forecasts for other than flood warnings, saving of lives, and reduction of flood damages. In several regions forecasts of river flow are used by municipal and other water supply officials for scheduling withdrawals of water at times of acceptable quality. Similarly, forecasts of river flow are being used by industries for withholding or treating wastes so as to limit releases to maintain acceptable water quality.

Richard M. Greening

The growing population, and industrial and agricultural output, with inevitable by-products which affect water quality, have led to a new appreciation of the importance of clean streams. The management of water quality throughout a river system is very complex and clearly requires forecasts of river flow to permit the optimum utilization of available water resources.

River forecasts for the Hudson River and its tributaries are prepared by our Northeast River Forecast Center located at Hartford, Connecticut. The collection of river and rainfall information throughout the Hudson Basin as well as the dissemination of forecasts is provided by our Albany, New York, office. This service provides a basis for the establishment of a more complete program which will be complementary to the activities of other Federal, State, and local agencies directly responsible for water quality or pollution abatement programs in the Hudson.

ESSA's Office of Oceanography in the Coast and Geodetic Survey has a highly developed capability in measuring the water flow in estuarine systems. This competence has been developed in a program of long standing. Current observations were first made in this area more than 100 years ago, using the methods available in that day. In succeeding years, additional observations have been made in anticipation of or in response to the needs of the marine community. With this continuing effort, we have developed field procedures for circulatory surveys and resources for daily reduction and analysis.

Our Engineering Division has recognized the need for improved instrumentation for measuring currents. This Division developed a telemetering buoy-current meter system which has since been widely used in estuarine surveys and which made possible more comprehensive descriptions of estuarine systems.

In 1958 and 1959 we carried out a survey of New York Harbor. Observations were made to determine the current, temperature and salinity field. This survey provides the data for a detailed description of the Harbor -- the necessity for dynamic studies of the area.

We are presently conducting an extensive circulatory survey of Long Island Sound. This survey, which will be completed during 1966, utilizes both the telemetering measuring sytem already noted and recently developed self-recording current meters. The data from this survey will be processed and analyzed in the C&GS and will be readily available for studies by other agencies and institutions.

Richard M. Greening

Recognizing the need for more sophisticated instrumentation, we have developed an integrated system for estuarine investigation. The system makes possible observation series of from one to six months, internally records data, and can be interrogated on command. It can simultaneously accommodate a large variety and number of sensors, and presents data in the digital format to facilitate processing and analysis.

As population increases and industrial activities intensify along our coasts, the demands on the marine environment are magnified. The capacity of the environment as a vehicle for waste abatement is ever more strained, while on the other hand our needs for commerce, for recreation, our very sensibilities demand that present standards for purity and beauty be maintained or enhanced. The first, the imperative need is for an adequate dynamic description of the marine environment. Coast and Geodetic Survey will intensify efforts to achieve comprehensive descriptions through better instrumentation, detailed field observations, and theoretical studies. The efforts will include an expansion to cover off-shore areas over the continental shelf. Coast and Geodetic Survey has the resources and the competence for comprehensive investigations in the marine environment, resources and competence that can be applied to special-purpose studies as well as more general studies.

The Environmental Science Services Administration will cooperate in efforts to coordinate these programs with those of other agencies to effect a comprehensive program in pollution abatement and control in this area. ESSA will be vigorous in initiating those additional programs indicated by the Administration's functions and by the needs of this and other areas.

Thank you.

(Applause.)

MR. STEIN: Thank you, sir.

Are there any comments or questions?

(No response.)

MR. STEIN: If not, Mr. Anderson?

MR. ANDERSON: We have just one more statement from another Federal agency, the Maritime Administration.

Mr. Olin T. Mirteenes, District Ship Custody Officer.

STATEMENT OF OLIN T. MIRTEENES,
DISTRICT SHIP CUSTODY OFFICER,
MARITIME ADMINISTRATION, UNITED
STATES DEPARTMENT OF COMMERCE,
NEW YORK, N. Y.

MR. MIRTEENES: Mr. Chairman, ladies and gentlemen:

I represent the Atlantic Coast Director in presenting this statement about water pollution controls in effect at the Maritime Administration Hudson River Reserve Fleet.

This National Defense Reserve Fleet currently comprises 175 inactive ocean-going ships at anchor in deep water off the west bank of the Hudson River at Jones Point.

Operations at this site consist of preservative maintenance and security measures conducted by a total work force of 86 employees. However, there are seldom more than 70 persons in attendance at any time.

Two towboats together with 13 smaller floating craft provide for transportation and power equipment services as needed.

Pages 39 and 40 of the "Report on Pollution of the Hudson River and its Tributaries" lists the Federal installations as being responsible for less than 1 percent of the total pollution. The Hudson River Reserve Fleet is 14th on the list of Federal offenders and is responsible for less than 1 percent of the Federal pollution.

Although this percentage is relatively insignificant, we have already taken steps to further improve upon control of pollution by the use of chemical toilets for employees working out on the laid-up ships.

In addition, we stand ready to cooperate with any agency in support of reducing pollution in the Hudson River Reserve Fleet.

We appreciate this opportunity to have our statement included in the record of this conference.

MR. STEIN: Thank you very much, sir.

(Applause.)

MR. STEIN: Are there any questions of Mr. Mirteenes?

(No response.)

MR. STEIN: If not, do you have anything further, Mr. Anderson?

MR. ANDERSON: That is all of the other Federal agencies at this time, Mr. Stein.

MR. STEIN: Well, to indicate the absolute impartiality of this, we are going to have another sister county official from the other side of Greater New York next.

I would like to indicate first, I see that the Waldorf is doing its part to alleviate the water shortage. You see the size of the glasses they put up.

(Laughter.)

I would like to call on Mr. Edwin Michaelian of Westchester County.

Mr. Michaelian.

STATEMENT OF THE HONORABLE EDWIN G. MICHAELIAN, COUNTY EXECUTIVE, WESTCHESTER COUNTY, AND MEMBER OF THE ADVISORY COMMITTEE TO THE SURGEON GENERAL OF THE UNITED STATES ON URBAN HEALTH AFFAIRS

MR. MICHAELIAN: Mr. Stein, members of the investigating panel, ladies and gentlemen:

I am the County Executive of Westchester County, a member of the Surgeon General's Advisory Committee on

Urban Health Affairs, Vice Chairman of the Metropolitan Regional Council, and immediate past President of the National Association of Counties.

All of these organizations and all of these respective committees have members that have worked on the Hudson River and are interested in this project.

I appear here ostensibly as the head of county government, as chief executive and administrative officer of the day, with these other connotations.

The purpose of this conference, as I understand it, is to determine the most advantageous ways that the Federal, State and local governments can work together in abating existing water pollution. I am happy to be here because I have advocated a crash water pollution abatement program as the first essential step to rehabilitate the Hudson and make its waters safe as well as attractive. It is my intention this morning to present to you some specific recommendations on this matter which we believe to be sound, in view of the excellent results that we have had in Westchester County in dealing with the problem over the past ten or more years.

The causes that have brought about the pollution in the Hudson River and its tributaries may be attributed to:

1. Many sources of untreated sewage at the local levels of government, who have the responsibility for same.

2. Industry has increased its activities along waterfronts and, because of it, their sewage and industrial wastes, a great part of which is untreated, flows into our waters.

3. Recreation-minded people, with more and more leisure time, have flooded our rivers with small and large boats, discharging sewage and other wastes.

Westchester County, aware of what was happening, not only to the Hudson River waters but the Long Island Sound as well, has taken some definite actions over the many years which have paid premium dividends. We believe it well for us to recite what some of our actions and accomplishments have been which have helped reduce pollution in both the Hudson River and Long Island Sound, and they are as follows:

1. In 1960, Westchester County expended 15 million dollars of district funds to construct a modern sewage treatment plant at Yonkers. This new plant replaced two inadequate plants. The

Yonkers Sewage Treatment Plant is now removing 70% of the polluting matter in sewage discharged to the Hudson River, in that area.

2. Mamaroneck and Blind Brook Plants:

The cost of upgrading these plants was $1,950,000 for Blind Brook and $5,700,000 for Mamaroneck. The expenditure of these funds was well worthwhile because, prior to updating, we were only removing 5 to 6 percent of suspended solids and now we note with great satisfaction that we are removing 60 to 70 percent of the suspended solids from the sewage.

3. Westchester County has also expended $6,080,000 for the construction of the New Rochelle Treatment Plant.

4. Westchester County has also, over the past few years, extended its trunk sewer systems, namely:

a. The Saw Mill Trunk Sewer System -- 1963 --

Edwin G. Michaelian

so that New York City now pumps all of the Mount Kisco sewage into that trunk system, thus alleviating pollution in the Croton Basin.

b. The Blind Brook Trunk Sewer System was also extended for approximately three miles in 1954. This action helped the City and Town of Rye immeasurably in the handling of their sewage.

c. In the City of New Rochelle, intercepting sewers were built, both east and west, to serve Pelham Manor to Larchmont. These intercepting sewers handled the sanitary sewers in those particular communities.

5. Aware of the fact that the use of the shorelines could well have an effect on the quality of waters in the Hudson and the Sound, Westchester County, over the years, has acquired 2,420 acres of land, at considerable cost to the taxpayers of our county. The lands acquired are:

Croton Point Park	504 acres
Blue Mountain Park	1,586 acres
Georges Island	134 acres
Kingsland Point	30 acres
Yonkers Treatment Plant	10 acres
Oscawana (condemnation proceedings now underway)	156 acres
Total	2,420 acres

6. Westchester County, aware of the changing times and the need for more technical information and knowledge, has obtained Federal grants during the past five years to do research. The research data obtained to date have already been profitable. One of the research projects undertaken by the county and which has been underway since 1963, has been an exploration of the ways that we could more economically dewater sewage sludge. Our findings were that one of the available polymers would do the job.

7. Westchester County also undertook research to determine how we could thicken sludge in order to reduce the number of barge trips out to sea

for disposal.

I might say that we have, in Westchester County, a barge that carries sludge out to sea, that is called the WESCO 1, which is 285 feet long, and it is really quite a project. Our neighbors in Rockland County made inquiry as to whether or not they could use this barge, and we said yes, we would be glad to cooperate with them and make the barge available to them on a joint cost-sharing proposition in the future, as soon as they get their sewage treatment plant in operation and their Commission comes up with something definitive with which we can work.

Our findings indicated that by the use of centrifuge, we were able to reduce our trips -- that is, the trips of the barge out to sea. In 1960 we were making 80 trips per year; presently it is necessary to make only 34 trips -- quite a difference.

8. Our County Department of Health, over the past eight years, at my direction, has increased its staff so that we could have constant supervision and monitoring of the public and private sewage disposal systems. In 1964, more than 420

septic tank failures and 23 failures of municipal sewers were investigated and promptly attended to. Likewise, our Health Department has been working with local municipalities in Westchester to improve the operational efficiency of their own plants.

9. In addition to the above, I am happy to report that comprehensive sewer studies are already underway, or contemplated, for the following Westchester communities:

a. Village of Briarcliff Manor -- Hudson River Drainage Area
b. Town of Rye
c. Village of Mamaroneck
d. Town of Cortlandt -- Sewer District #3
e. The Town of Lewisboro

We believe that Westchester County has been alert, forceful and progressive in undertaking a plan of action to abate water pollution, not only in the Hudson River but the Long Island Sound as well, and I keep emphasizing the Sound because we are surrounded by both. On the basis of our successful experience with the projects which I have enumerated and because of our concern not only for the Hudson River and the Long Island Sound, but the Mohawk River and its tributaries as well, I take the liberty of proposing an eight-point program for your consideration which I believe will assist greatly in further reducing water pollution in the Hudson River.

THE RECOMMENDATIONS

1. New York State Program

We commend the Governor of New York State, The Honorable Nelson A. Rockefeller, for his foresight in these matters and urge the people of the State of New York to support the $1,750,000,000 program. We strongly recommend that on November 2, 1965, Election Day, the voters support Proposition #1, which authorizes a State Bond Issue of one billion dollars to finance the beginnings of this program.

2. Standards:

We support the principle that the States and not the Federal Government should set standards for the quality of waters and that the State also be charged with the responsibility for enforcement.

3. Federal Grants

There is need for more Federal grants and funds to assist local municipalities in constructing more and better treatment plants. The present S. 4 bill, which is the Water Pollution Control Law, raises the dollar limitation on the construction grants of sewage treatment works to $1.2 million for a single project and $4.8 million for a joint project. This is not enough.

Under the present allocations, prior to this bill the County of Westchester received the sum of $250,000 as an incentive for building a $15 million plant in Yonkers. On our latest venture in the Village of Mamaroneck, a $5,750,000 plant, we are getting a little better percentage. We are getting about 9 percent of that back.

In Yonkers it was just a pittance, $250,000 out of $15 million, but in this instance it is about $600,000 out of $5,750,000, which is nearly 10 percent.

Still, this is not enough.

The Federal Government has appropriated no more than $150 million for the entire Nation, to assist with the construction of these treatment plants, in comparison with the Rockefeller proposal of $1,750,000,000 for the State of New York alone. Federal funds are most inadequate.

Of course, that $1,750,000,000, I might say, parenthetically, covers the entire depollution of the Hudson River and its tributaries, the depollution in New York State.

We recommend that the Federal Government appropriate a minimum of $5 billion for this program, so that all of the States and the local municipalities of our country may engage in the construction of sewage treatment plants in order to preserve our water resources and healthful climate. We further propose that Federal funds be made available to the local municipalities on a 30 percent Federal, 30 percent State and 40 percent local matching basis. In instances where one or more municipalities under an approved area plan unite in a joint treatment plant, each of the above levels of government share the cost on the same basis.

This should provide incentives for the joint ventures in abatement of pollution.

4. Enforcement of the Law

We have previously stated that the initial responsibility of setting up standards should rest with the States and that these standards should be subject to Federal approval. However, we further recommend that the States should immediately set up machinery to be able to enforce the existing laws to be sure that local municipalities are adhering to standards.

5. Research

Funds should be made available by both the Federal and State governments so that research can be undertaken to find means and ways of separating storm water from sanitary sewage. The Federal Government appropriates the sum of approximately $20 million per year for this research. As immediate past president of the National Association of Counties, I know that many of the counties and local governments would engage in further research were it economically possible for them to do so. Therefore, we recommend that the Federal Government increase its appropriation as the needs may indicate.

6. Legislation

We need to reappraise the permissive legislation that we now have, wherein local municipalities, at their discretion, may form joint sewer districts on their own or through their county government. We believe that counties and municipalities throughout the State need to be encouraged and stimulated to undertake such projects. In instances where such action is desirable, but not taken, initiative to act should be placed in the hands of a Board of Review at State level which should be authorized by State legislation to mandate studies and conduct hearings to accomplish this end.

Personnel

Again, as immediate past President of the National Association of Counties, I know that many local governments are having difficulty recruiting and retaining superintendents and chief operators of sewage treatment plants. We recommend that State aid be increased and extended to the local municipalities to permit them to recruit highly skilled professional technicians, in order to properly do the job.

8. Public Relations

There is need for an extensive public relations program to alert not only the Federal, State and local governments, but the public in general. We therefore recommend that the States undertake the responsibility for an effective and meaningful public relations program that will not only alert the people, industry and government to the problems, but will also be informative on matters concerning the technical aspects as well.

Insofar as the future is concerned, indications are that all municipalities discharging into tidal waters, including the Hudson River, may be required to upgrade the quality of their treatment facilities. Implementation of these regulations would require construction of new and additional treatment facilities with the concomitant need of larger appropriations to fund such projects. Local governments cannot do the job alone. They are in need of skilled technicians, technical know-how, facilies and monies. A partnership program among the Federal, State, county and local governments, together with business and industry, can best do the job that needs to be done. We ask that you consider the recommendations made, for we believe, once again, that the successful experiences that we have had in Westchester County can well be duplicated throughout the State.

Thank you very much.

(Applause.)

MR. STEIN: Thank you, Mr. Michaelian.

Without objection, your whole statement will appear as if read.

MR. MICHAELIAN: Thank you.

MR. STEIN: Are there any questions or comments?

(No response.)

MR. STEIN: If not, at this point we have one more short statement by Mr. William Henry Osborn, President of the Hudson River Conservation Society.

Mr. Osborn.

STATEMENT OF WILLIAM H. OSBORN,
PRESIDENT, HUDSON RIVER CONSERVATION SOCIETY

MR. OSBORN: Thank you very much for giving me a chance to speak here.

I am William Henry Osborn, President of the Hudson River Conservation Society, the oldest organization in the Valley dedicated to the improvement of the river.

For 29 years the Society has worked to eliminate pollution of the Hudson's water and air, to protect and maintain the beauties of the Valley, to preserve its scenic and historical landmarks, to develop its recreational values, and to cooperate with industry and, where necessary, to seek its regulation to achieve these ends. Those are in our charter.

Our past accomplishments are a matter of record and are well known to the citizens of the Valley. There is no need to list them at this time.

What the Hudson River needs now is action, not another re-examination of its problems. We who live on the river know the problems. They have been surveyed time and again by many authorities.

William H. Osborn

New York State already has done much for the river. If the billion dollar "clear waters" referendum is approved this fall by the voters, it will give the State most of the tools needed to clean up the river.

What is needed now is the hearty cooperation of the Federal Government and sufficient appropriations to supplement the State's already extensively and carefully planned blueprint for cleaning up the river.

Our Society suggests to the conference that this is a favorable time for action on all governmental levels. There is more interest now in all phases of conservation than in many years past. We believe much of this interest was stirred by our Society, which emphasized the pollution story to 10,000 people in the Valley in the 1964-65 season by lectures and film showings.

Our experience indicates that the people of New York State are demanding action to clean up all pollution and especially the Hudson. We believe they expect the State to lead the way with the Federal Government lending technical and financial facilities and support.

The Hudson is essentially a New York River. It seems fitting that New York should lead in the water pollution abatement program.

Thank you very much.

MR. STEIN: Thank you, sir.

(Applause.)

MR. STEIN: Are there any comments or questions?

(No response.)

MR. STEIN: I have a telegram here addressed to me, which reads:

> "We support the New York State program to facilitate the control of water pollution statewide and because of its importance as a water resource, especially the Hudson River and its tributaries. Because the source of pollution of the Hudson River occurs in communities and municipalities with inadequate pollution control measures throughout the Hudson watershed, the financial assistance provided by the proposed bond issue is essential.
>
> /s/ A. A. Johnson
> Director of Extension, NYS
> Colleges of Agriculture and
> Home Economics Cornell University,
> Ithaca, N. Y."

At this point, we, I think, can get back to the regular presentation of the Federal program. Then we will turn the time over to the States.

Before I call on Mr. Anderson, I know several water resources people in Ithaca, New York, and the wording of that telegram seemed familiar.

As a matter of fact, these meetings form sort of a catalyst, because, as you may guess, we have several water pollution control experts from various parts of the country who haven't seen each other here. I have seen some rather unique combinations of people getting together, people who have not talked to each other for a while.

As you can expect, we are going to have some very fertile ideas, and most of them will be coming to us, because the essential part of those ideas, I am sure, is going to be money.

I am just watching the audience and totaling up mentally what this is going to cost when we are through.

Let us call on Mr. Anderson now for the Federal presentation.

MR. ANDERSON: Our main Report on Pollution of the Hudson River and its Tributaries will be presented by Mr. Paul De Falco, Jr., Project Director of our Hudson-Champlain and Metropolitan Coastal Comprehensive Water Pollution Control Project.

Mr. De Falco.

STATEMENT OF PAUL DE FALCO, JR., PROJECT DIRECTOR, HUDSON-CHAMPLAIN AND METROPOLITAN COASTAL COMPREHENSIVE WATER POLLUTION CONTROL PROJECT, UNITED STATES DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, METUCHEN, NEW JERSEY

MR. DE FALCO: I am Paul De Falco, Jr., Project Director of the Hudson-Champlain and Metropolitan Coastal Comprehensive Water Pollution Control Project, of the United States Department of Health, Education, and Welfare, based at Metuchen, New Jersey.

On the basis of requests from Governor Nelson A. Rockefeller of New York and Governor Richard J. Hughes of New Jersey, and on the basis of reports, surveys or studies, in accordance with Section 8 of the Federal Water Pollution Control Act (33 U.S.C. 466 et seq.), the Secretary of Health, Education, and Welfare called a conference in the matter of pollution of the Hudson River and its tributaries. Representatives of the States of New York and New Jersey and the Interstate Sanitation

Commission were invited to participate in the conference with representatives of the Department of Health, Education, and Welfare.

This report is based on recent studies conducted under the supervision of the Department of Health, Education, and Welfare, in addition to data obtained from other Federal, State and local agencies.

We gratefully acknowledge the cooperation of the Water Resource and Public Health agencies of the States of New York and New Jersey, the Interstate Sanitation Commission county and municipal agencies, and other private and public groups in the conference area.

DESCRIPTION OF AREA

General

The geographical area considered is shown in Figure 1. It encompasses the Upper Bay of New York Harbor, including Newark Bay, the Kill Van Kull, the East and Harlem Rivers and the main stem of the Hudson River from the Battery to the head of navigation at the Federal Lock at Troy, New York. All of the waters are maintained by the Federal Government as navigable waterways. The

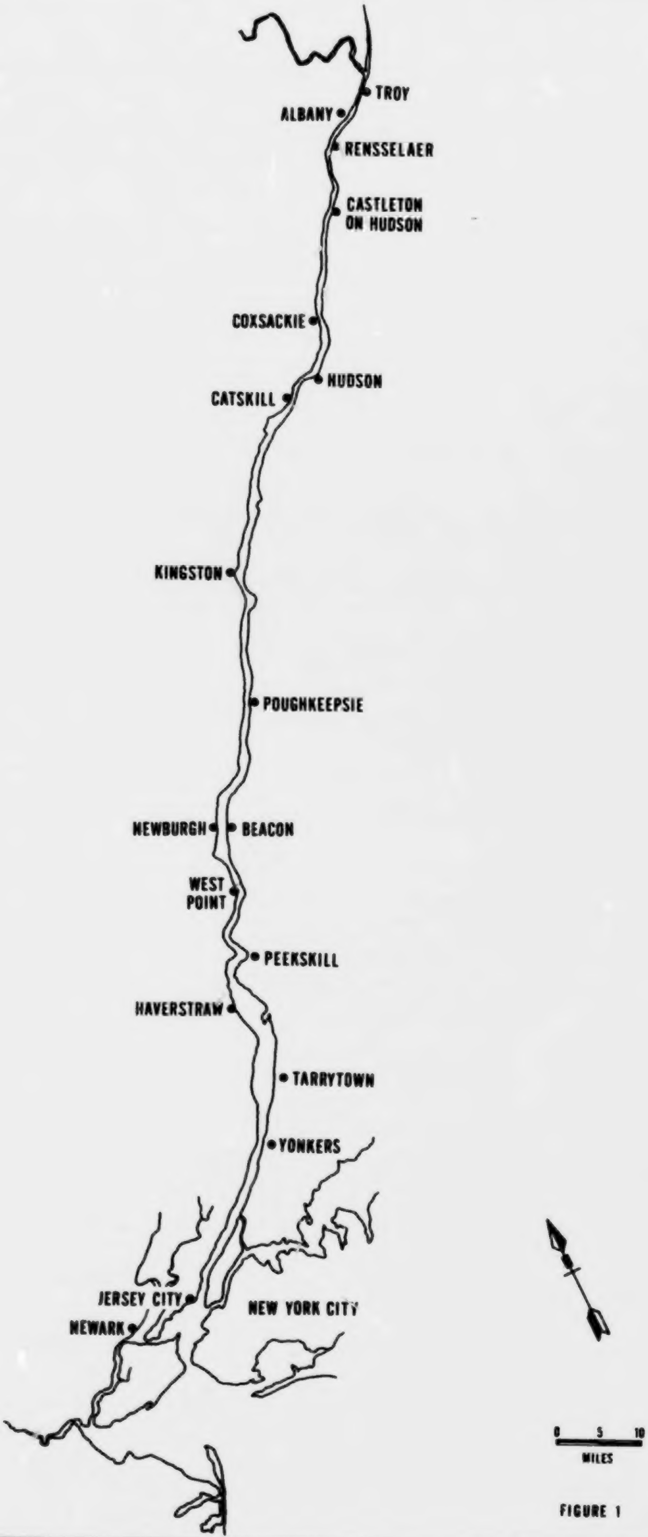
TROY
ALBANY
RENSSELAER
CASTLETON ON HUDSON
COXSACKIE
HUDSON
CATSKILL
KINGSTON
POUGHKEEPSIE
NEWBURGH
BEACON
WEST POINT
PEEKSKILL
HAVERSTRAW
TARRYTOWN
YONKERS
JERSEY CITY
NEWARK
NEW YORK CITY
0 5 10
MILES

FIGURE 1

Paul De Falco, Jr.

distance from the Narrows to the Battery is approximately seven miles, and the Hudson River extends another 151 miles from the Battery to the head of navigation at Troy.

The State line between New York and New Jersey in the conference area extends through the Kill Van Kull to the middle of Upper New York Bay. It then proceeds up the middle of the Hudson River to a point opposite Hastings-on-Hudson, where it turns westward.

The area varies from the highly complex urban metropolitan region in and adjacent to New York City to essentially a rural section upstream, with the exception of the urban-industrial complex of the Albany-Troy-Rensselaer region.

The Upper New York Bay is considered the center of the New York Harbor complex. This basin is connected to and surrounded by four major water systems, each of which affects Upper Bay water quality in some manner. The largest and most important is the Hudson River, joining the Upper Bay at its northern extremity.

The East River is a tidal strait connecting the Bay and Long Island Sound. In the vicinity of Wards Island, the East River joins the Harlem River, which, in turn, connects with the Hudson River at Spuyten Duyvil. Upper New York Bay is connected with Newark Bay by the

Kill Van Kull. The two major tributaries of Newark Bay are the Hackensack and Passaic Rivers, draining the northeastern portion of New Jersey.

The Narrows connects the Upper Bay with Lower New York Bay. Major tidal flow into the harbor complex is through this passage.

Agency Responsibilities

The New York State Department of Health and the New Jersey State Health Department are responsible for administering pollution abatement programs in their respective States. The responsibility for administering pollution abatement programs south of the Bear Mountain Bridge is shared by the Interstate Sanitation Commission, the New York State Department of Health, and, in the interstate reach, the New Jersey State Health Department.

In 1936, the States of New York and New Jersey formed an interstate compact, which was later joined by Connecticut. The compact established classifications for recreational and non-recreational uses and set both effluent and stream standards for the attainment of these objectives (Appendix B). The States set up the Interstate Sanitation Commission to enforce the standards and to report annually to the States on the status of pollution abatement in their mutually interstate waters. The Commission can require compliance of any local governmental body within its jurisdiction by legal procedures, and has done so in a number of cases. The Commission is specifically authorized under Article XII of the Compact to develop an overall plan of pollution abatement for the waters of concern.

The New York State Water Resources Commission, successor to the Water Pollution Control Board, has classified the waters of the Upper Hudson and prepared a comprehensive plan for the abatement of pollution in the river. The plan was adopted in 1955 and contains specific provisions and recommendations for each municipality and industry concerned. The procedure for implementing the plan consists of two phases: a cooperative phase and an enforcement phase. The enforcement phase requires legal action by the State against the offending polluter.

The State of New York in cooperation with the Interstate Sanitation Commission has established compatible classifications in the area of joint jurisdiction (Appendix A) and has adopted a comprehensive plan with specific recommendations and scheduling of projects to accomplish the objectives.

The New Jersey State Department of Health has declared that in waters under both its control and the Interstate Sanitation Commission, the requirements of the Tri-State Compact apply, and it has conducted its program of pollution abatement in the Hudson River Basin accordingly. The State has adopted a classification procedure for the waters under its jurisdiction, but has not yet classified its waters covered by this report.

Hydrology

Water storage in the Hudson River Basin upstream of Troy, New York, totals nearly 1,700,000 acre feet. About half of this storage is used for hydroelectric power production and the remainder for water supply, navigation, flow regulation, and recreation.

Approximately 60 percent of the total drainage basin of the Hudson River is upstream from the Federal Dam at Troy. This area is about 8,100 square miles, with a regulated portion of about 30 percent, or 2,450 square miles. Stream gauging records at Green Island upstream from the Troy Lock show the average annual flow to be 13,060 cubic feet per second (cfs). An additional 5,300 square miles are tributary to the river from Green Island to the Battery. Prorating flow on a square mile basis, the average annual discharge of fresh water at the Battery would be 21,800 cfs from the total drainage area of 13,400 square miles.

Upstream flow regulation results in increased summer flows. The most probable once in ten years minimum monthly regulated discharge in the Lower Hudson River is 4,700 cfs, and the minimum weekly 3,000 cfs. The present extended drought has produced critical conditions of extreme low flow in the river. For example, during the summer of 1965, minimum daily mean flows in the order of 1,600 cfs have been recorded at the Green Island gauging station.

Tidal action has a mean range of 2.9 to 4.4 feet in the Upper Bay. Tidal influence in the Hudson River extends upstream to the Federal Dam at Troy and affects the entire area. Tidal ranges from the Battery to Troy are shown in Table 1. The effects of salt water intrusion extend to West Point during normal flow and above Newburgh under extreme low flow conditions.

Flood currents in the Hudson from the Upper Bay northward are in the order of 1.4 to 3.0 feet per second (fps) and ebb currents 2.0 to 4.1 fps. Slack water occurs about 3-½ hours later at Bear Mountain and 7-½

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hours later at Albany than at the Narrows. These distances are north of the Narrows about 53 and 152 miles.

The stream gradient in the Hudson River is very slight, dropping five feet in 150 miles. The river changes from a narrow, shallow stream at Troy to a broad and deep waterway at the New York City line. Virtually all fresh water entering the New York Harbor complex, with the exception of sewage and industrial wastes, is supplied by the Hudson.

There is no significant net flow in the East River. All water movement is due to tidal action and is oscillatory in nature. Fresh water flows enter the Harlem River from the Hudson River. Velocities are such that water entering the Harlem River from the Hudson River on an ebbing current will be carried to the East River. On the flooding current, water from the East River will flow to the Hudson through the Harlem.

The major flows into Newark Bay are the Hackensack and Passaic Rivers, which together have a relatively negligible fresh water flow during drought periods. Newark Bay does not have water depths at low tide of more than six feet, except in the dredged channels. Without tidal flows, the area outside the main channels in Newark Bay would be practically stagnant. Net movement of waters in Newark Bay is to the Upper Bay through the Kill Van Kull rather than down to the Arthur Kill.

Population

The area under consideration has a population of 12.3 million people. Eleven million, or 90 percent, are located in the New York-New Jersey metropolitan area. The remaining 1.3 million are located north of the Westchester County-New York City boundary line.

Population density varies widely throughout the area. It ranges from the rural density in Greene County of 48 persons per square mile to Manhattan with 77,000 per square mile in Manhattan. The major population center in the upper reach of the Hudson River is located in the Albany-Troy-Rensselaer region.

In general, counties within the area increased in population during the period 1950-1960. These increases ranged from 7.5 percent to 56.2 percent. One exception to this general trend was the five boroughs of New York City, which had a total population of 7,891,957 in 1950 and 7,781,984 in 1960, a decrease of 1.4 percent.

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Economics

The Hudson provides navigable waters between the two metropolitan areas of New York City and Albany. Additional urban centers are developing in the Kingston-Poughkeepsie area.

In the Upper Hudson River area the economic base is primarily agricultural, with manufacturing plants spread along the length of the river. In the Albany-Troy-Rensselaer area there is a concentration of commercial, industrial and residential development. In this upper river area, approximately 127,000 persons are engaged in manufacturing operations.

The economic make-up of the New York-New Jersey metropolitan area is primarily commercial and residential, with some industrial development. The industrial development in the New York City area includes oil refineries, manufacturing operations, processing plants and shipyards. Of the 446 types of manufacturing industries listed by the Federal Bureau of Census, the Metropolitan area lacked only about 30 types in 1954 among the 50,000 plants in the region. Approximately 1.9 million people are involved in manufacturing operations within this area.

The New Jersey-New York Port is an area with

650 miles of usable waterfront. Along its shores are more than 200 piers capable of handling 400 ocean-going vessels at one time. Behind these piers are warehouses with 15 million square feet of floor space accommodating cargoes of every description.

Table 1

HUDSON RIVER TIDAL RANGES

Locality	Mean Range of Tide (feet)[1]	Mean Range of Spring Tide (feet)
Battery	4.4	5.3
Spuyten Duyvil	3.9	4.7
Tarrytown	3.6	4.3
Peekskill	3.2	3.8
Beacon	3.1	3.8
Poughkeepsie	3.2	3.8
Rhinecliff	3.7	4.4
Tivoli	3.9	4.7
Hudson	4.1	4.9
Stuyvesant	4.2	5.0
Castleton	4.9	5.9
Rensselaer	4.9	5.9
Albany	5.3	6.4
Troy	5.5	6.6

[1] Based on records for July, August, and September 1950, adjusted to long-term mean at Fort Hamilton.

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WATER USES

Municipal Water Use

Present municipal water use of the main stream of the Hudson River is indicated in Table 2.

Table 2

Municipal Water Supplies

Hudson River

Community	1960 Population Served	Av. Water Use mgd
Rensselaer, N.Y.	15,000	2.2
Highland, N.Y.	4,469	1.0
Port Ewen, N.Y.	2,622	0.5
Poughkeepsie, N.Y.	60,000	7.0
	82,091	10.7

The river, upstream from the area affected by salt water is used as a water supply by four communities serving a population of 82,000 people, with a daily use of 10.7 million gallons. The majority of communities located along the river obtain their water supply from tributary streams, lakes or wells, rather than from the Hudson River. Below Newburgh, salinity increases and the water is not considered usable as a public water supply.

The New York State Water Resources Commission has recently approved the New York City's application for withdrawal of 100 mgd of water from the Hudson River at Chelsea to augment New York City's upland reservoir supply. This withdrawal was approved by the State Health Department as an emergency source with special requirements. When this withdrawal occurs, New York City will be the major user of the Hudson as a source of municipal water supply. Of the four communities currently using the river, the City of Rensselaer has been ordered by the State Health Department not to use the Hudson River water after April 1966. An agreement has been made with the City of Troy to serve Rensselaer as of that date. During the current period special treatment requirements are in effect.

Plans are being formulated for use of the Hudson as a source of water supply for a group of communities in the Duchess County Water District. These plans represent an estimated expenditure of $27 million. The town and village of Rhinebeck are currently constructing a water supply system at a cost of $800,000. The source will be the Hudson and will serve approximately 4,000 persons. Representatives of the Ulster County Planning Board recently indicated that the county also may have to tap the Hudson River as its ultimate water supply.

The present water shortage has emphasized the value of the Hudson River as a source of water supply for the growing urban area downstream, including northern New Jersey.

Institutional Water Use

Two institutions in Duchess County, the Hudson River State Hospital at Poughkeepsie and the Castle Point VA Hospital at Chelsea, use the Hudson River as a potable water supply source.

Industrial Water Use

From Troy to the New York City line, 32 industries use the Hudson River for industrial processing and cooling water. In the lower reaches the primary use of the river is for cooling purposes. For example, in the Westchester-Rockland County area, eight industries and steam generating plants use a total of 119 mgd for cooling water.

In the New York metropolitan area, the primary use of river and harbor water is for cooling purposes by steam generating plants and industries. Industrial use, exclusive of the New Jersey plants, amounts to 3,743 mgd from the Harlem and East Rivers, 165 mgd from the Hudson River, and 16 mgd from the Kill Van Kull.

Recreation

Extensive recreational use is made of the waters within the area under consideration, although poor water quality seriously limits most water contact activity. Plans are now being made by New York State through the Hudson River Valley Commission to expand the recreational use of the river. From Ellis Island north to Troy, along the Hudson River, there are a total of 87 private marinas and yacht clubs, as listed in Table 3.

The large number of marinas and yacht clubs is indicative of the extensive use made of these waters for pleasure boating. Where such pleasure boating flourishes, there is an increase in water contact activity, with a resultant increase in health hazards where polluted waters exist.

A list of public beaches and waterfront parks is given in Table 4. Of the 40 public parks in the area, 29 are in the lower portion below Croton-on-Hudson. These parks serve the concentrated population centers of Westchester County, Rockland County, New York City, and New Jersey contiguous areas.

Swimming is not authorized on the Hudson River downstream from Kingsland Point Park in North Tarrytown. Other authorized swimming areas are Croton Point Beach and Nyack Beach State Park. However, swimming is practiced at docks and piers and in many areas where natural beaches are found along this same portion of the river. Despite polluted conditions, there is unauthorized swimming along the Manhattan-New Jersey stretch of the river. The last beach that operated just north of the George Washington Bridge on the New Jersey shore was closed in the 1930's because of water pollution. Swimming is not authorized at the several recreational parks on the Manhattan and Queens shorelines of the Harlem and East Rivers and Upper Bay. However, swimming does occur to a limited extent in these areas.

Recreation in the Newark Bay and Kill Van Kull is limited to occasional sport fishing, more frequent pleasure boating, and some unauthorized swimming.

Each year the Staten Island Ferry carries an estimated million visitors to New York City between the

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Battery and St. George. In addition, four commercially operated sightseeing companies operate boats which travel around Manhattan Island. In 1959, it was estimated that they carried over a million tourists through the north end of the Upper Bay. Another 770,000 persons visit the Statue of Liberty each year. The unesthetic stain of pollution upon these waters is thus observed at close hand by large numbers of people. In addition, air travelers utilizing all of the metropolitan airlines can readily observe this stain upon the face of the harbor.

The Hudson River, despite its present condition, is being used extensively as a recreational resource. However, present abuse has a limiting effect on its use and plans are now being developed to enhance the river to permit recreation on a more comprehensive basis.

This year the Hudson River Valley Commission was established by New York State to plan for the best use and conservation of the Hudson River as a natural resource. These activities include: finding ways to preserve the great scenic areas; investigating pollution; exploring the possibilities of zoning to help beautify the river; and encouraging boating and the water sports for which the river is suited, through the planning of new public and private marinas and launching facilities.

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Improvement in water quality is an important factor in furthering development of the full potential of the Hudson River. This fact has been recognized and acknowledged by many governmental, civic and other local organizations.

Table 3

Private Marinas and Yacht Clubs on the Hudson River Between Ellis Island and Troy

Name	Location
79th Boat Basin-Hudson Harbor	New York City
Edgewater Yacht Club	Edgewater, N.J.
Riverdale Yacht Club	Riverdale, N.Y.C.
Englewood Yacht Basin	Englewood, N.J.
Ludlow Marine Corp.	Ludlow (Yonkers)
Mirsky's Outboard Marina, Inc.	Yonkers
Hudson Boat Club	Yonkers
Yonkers Corinthian Boat Club	Yonkers
Yonkers Yacht Club	Yonkers
Palisades Boat Club	Yonkers
Hastings Pioneer Boat Club	Yonkers
Tower Ridge Yacht Club	Yonkers

Private Marinas and Yacht Clubs on the Hudson River Between Ellis Island and Troy (Cont'd)

Name	Location
Dobb's Ferry Marina	Dobb's Ferry
Irvington Boat Club	Irvington-Yonkers
Cornetta's Marina	Piermont
Leach's Marina	Piermont
Shordine's Fort Comfort Yacht Basin	Piermont
Washington Irving Boat Club	Tarrytown
Tarrytown Marina, Inc.	Tarrytown
Powell's Boat Yard	Nyack
Nyack Boat Club	Nyack
Julius Petersen Boat Yard	Nyack
Westerly Marina	Ossining
Selazzo Marina	Ossining
Shattemuc Yacht Club	Ossining
Rockland-Bergen Yacht Club	Haverstraw
Riverview Boat Club	Haverstraw
Croton Yacht Club	Croton-on-Hudson
Grassy Point Marina	Haverstraw
Minisceongo Yacht Club	Haverstraw
Ba-Mar Basin	Haverstraw
Seaweed Boat Landing	Stony Point Bay, Haverstraw

Private Marinas and Yacht Clubs on the Hudson River Between Ellis Island and Troy (Cont'd)

Name	Location
Montrose Yacht Club	Montrose, Haverstraw
Kings Ferry Marina	Greens Cove-Montrose, Haverstraw
Hudson Shore Marina	Verplanck, Haverstraw
Tompkins Cove Boat Club	Tompkins Cove, Haverstraw
Peekskill Yacht Club	Peekskill
See's Boat Yard	Peekskill
Garrison Marina	Garrison
Fort Montgomery Marina	Fort Montgomery
Cold Springs Boating Club	Cold Spring
Cornwall Yacht Club	Cornwall-on-the Hudson
Hanaford's	Newburgh
Newburgh Yacht Club	Newburgh
Dutchess Boat Club	Beacon
Chelsea Yacht Club	Chelsea
Macri's Marina	Middle Hope, Beacon
New Hamburgh Yacht Club	New Hamburgh
White's Hudson River Marina	New Hamburgh
Marlboro Yacht Club	Marlboro
Poughkeepsie Yacht Club	Poughkeepsie
Pirate Canoe Club	Poughkeepsie

Private Marinas and Yacht Clubs on the Hudson River Between Ellis Island and Troy (Cont'd)

Name	Location
Highland Marina	Poughkeepsie
Riverdale Boat Basin	Roosevelt, Poughkeepsie
Roger's Point Boating Association	Poughkeepsie
Norrie Yacht Basin	At Indian Kill, Poughkeepsie
Hidden Harbor	Port Ewen
Rays	Kingston
Ideal Marina	Kingston
Dwyer's Boat Basin	Kingston
Mid-Hudson	Kingston
Kingston Power Boat Association	Kingston
Lou's Boat Basin	Kingston
DuCraft Boat Basin	Kingston
Anchorage Rest	Kingston
Roundout Yacht Club	Kingston
Barrytown Boat Club	Barrytown
Saugerties Power Boat Association	Saugerties
Lynch's Marina	Saugerties
Maiden on Hudson	Saugerties
Roe-Jan Creek Boat Club of Linlithgo	Linlithgo Station, Catskill

Private Marinas and Yacht Clubs on the Hudson River Between Ellis Island and Troy (Cont'd)

Name	Location
Catskill Marina	Catskill
Hop-o-Nose Marina	Catskill
Catskill Boat Club	Catskill
Hudson Power Boat Association	Hudson
Athens Marine Center	Athens
Coxsackie Yacht Club	Coxsackie
Newton Hook Boat Club	Coxsackie
Ronnie's Marina	New Baltimore
Gerry Finke's Marina	Coeymans, Albany County
Ravena Coeyman's Boat Club	Coeymans, Albany County
Tri-City Yacht Club	Albany County
Castleton Boat Club	Castleton-on-Hudson
Albany Yacht Club	Albany
Rensselaer Marina	Albany
Boating Center	Albany
Tri-City Yacht Basin	Watervliet

Table 4

Public Beaches and Waterfront Parks in the Conference Area

NAME	LOCATION	OWNERSHIP
Shore Park	New York City	Municipal
Owls Head	New York City	Municipal
Liberty Island	New York City	Federal
Ellis Island	New York City	Federal
Battery Park	New York City	Municipal
Henry Hudson Memorial Park	New York City	Municipal
Riverside Park	New York City	Municipal
Ft. Washington Park	New York City	Municipal
Fort Tryon Park	New York City	Municipal
Inwood Hill Park	New York City	Municipal
Riverdale Park	New York City	Municipal
East River Park	New York City	Municipal
Queens Bridge Park	New York City	Municipal
Rainey Park	New York City	Municipal
Ward's Island Park	New York City	Municipal
Randall's Island Park	New York City	Municipal
Carl Schurz Park	New York City	Municipal
High Bridge Park	New York City	Municipal
Elysian Park	Hoboken	Municipal

Public Beaches and Waterfront Parks in the Conference Area (Cont'd)

NAME	LOCATION	OWNERSHIP
Palisades Interstate Park	Fort Lee - Storm King	State
Tallman Mountain Park	Tallman	State
Boyce Park	Ludlow (Yonkers)	Municipal
Trevor Park	Glenwood	Municipal
Untermyer Park	Greystone	Municipal
Irvington Park	Irvington	Municipal
Kingsland Point Park	North Tarrytown	County
Memorial Park	Nyack	Municipal
Rockland Lake Park	Rockland Lake	State
Nyack Beach Park	Upper Nyack	State
Harmon Park	Croton on Hudson	County
Croton Point Park	Croton on Hudson	County
George Island Park	Crugers	Municipal
Fort Hill Park	Peekskill	Municipal
Downing Park	Newburgh	Municipal
Eastman Park	Poughkeepsie	Municipal
Wheaton Park	Poughkeepsie	Municipal
Pulaski Park	Poughkeepsie	Municipal
Norrie State Park	Staatsburg	State
Ogden Mills State Park	Staatsburg	State

Public Beaches and Waterfront Parks in the Conference Area (Cont'd)

NAME	LOCATION	OWNERSHIP
Seamon Park	Saugerties	Municipal
Waterfront Park	Troy	Municipal
Van Schaick Island Park	Troy	Municipal

* * *

Commercial Navigation

The New York Harbor area and the entire Hudson River north to the Federal Dam at Troy are used for navigation. The total amount of water-borne commerce of the Port of New York amounted to 153,198,620 short tons in 1960. Navigation is presently a major use of the Upper Harbor and lower portion of the Hudson River. There are 90 piers in New York alone between the Battery and 72nd Street. Additional piers are located on the New Jersey side of the river. The Port of New York is the largest in the United States.

At the Port of Albany, New York, the total traffic for 1960 amounted to 6,990,978 short tons, represented by a total of 5,267 vessel trips. At the

Federal Lock at Troy, New York, with a navigation season running from April 21 to December 14, the total traffic amounted to 3,353,429 short tons in 1960.[1]

The Hudson River constitutes an important link in the New York State Barge Canal system. Commercial navigation from the Port of New York can travel via the Hudson River and the Barge Canal to Lake Champlain and the St. Lawrence Seaway in the north, or to the Great Lakes in the west.

Fish

Historically the Hudson River has served as a large resource for both commercial and sport fisheries. Data from the New York State Conservation Department, presented in Table 5, indicate a continual decline in the commercial fishing harvest in recent years, primarily attributable to a 50 percent reduction in the shad catch and a 65 percent reduction in the striped bass catch.

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[1] Waterborne Commerce of the United States - Calendar Year 1960, Department of the Army, Corps of Engineers.

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At present, fishing in the river is not fully exploited because of a natural reluctance on the part of fishermen to work in and take fish from areas contiguous to the discharge of raw sewage.

Table 5

Commercial Catch in New York State Waters of Hudson River 1959-1963
(In thousands of pounds)

	1959		1960		1961		1962		1963	
Species	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%
Bullhead	2.4	0.3	0.9	0.2	0.7	0.17	0.2	0.06	0.6	0.2
Carp	11.9	1.5	15.5	3.9	6.6	1.6	11.3	3.2	10.5	4.1
Catfish	20.4	2.6	23.0	4.6	19.0	4.8	14.6	4.2	9.0	3.6
Eels	10.1	1.3	3.6	0.7	16.0	4.0	6.5	1.8	7.1	2.8
Herring*	45.6	5.8	38.2	7.6	33.8	8.5	38.2	11.0	32.3	12.8
Shad	538.7	69.4	273.9	54.8	236.5	60.0	218.2	63.1	132.5	52.9
Striped Bass	133.1	17.1	132.9	26.6	70.7	17.9	48.1	13.9	46.7	18.6
Sturgeon	3.3	0.4	3.8	0.7	2.3	0.5	2.5	0.7	3.2	1.2
Suckers	1.0	0.1	0.8	0.2	1.5	0.3	0.8	0.2	0.6	0.2
Sunfish	0.2	0.03	0.3	0.06	0.1	0.02	0.2	0.06	0.3	0.1
Tomcod	1.2	0.1	1.7	0.3	0.8	0.2	1.1	0.3	1.3	0.5
White Perch	8.4	1.0	4.3	0.8	6.3	1.5	4.1	1.1	5.8	2.3
Yellow Perch	0.4	0.05	0.4	0.08	0.1	0.02	—	—	0.6	0.2
Total Catch	776.7		499.3		394.4		345.8		250.5	

*Includes the Alewife, Alosa pseudohorengus and the Blueback herring, Alosa aestivales.

Hydro Power

The Hudson River is used at the Troy Lock and Dam also as a source of power for the Ford Motor Company plant at Green Island, New York. No other use is made for hydroelectric purposes within the limits of the conference area.[1]

However, interest has also been shown in pumped storage possibilities in the Hudson River Valley recently.

CLASSIFICATION AND STATUS OF PROGRAMS

Classification of Waters

New York State has undertaken a program of classification of its streams to establish the best possible water usage. (Appendix A). The Interstate Sanitation Commission has classified waters under its jurisdiction. (Appendix B). New Jersey initiated its classification procedure in 1964 and has not yet classified their waters in the area. However, it has declared that the requirements of the Interstate Sanitation Commission apply. The State has also stipulated that minimum treatment consists of sedimentation and chlorination in tidal waters.

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[1] Lower Hudson River Report No. 5, New York State Department of Health.

New York State's classification of the Hudson River waters is as follows:

> From the Troy lock to the south of Houghtailing Island - Class C - fishing and fish culture.
>
> From the south end of Houghtailing Island to the southern end of Esaupus Island - Class B - bathing and general recreation.
>
> From the south end of Esaupus Island to the general area of Chelsea - Class A - water supply.
>
> From the Chelsea area to the Bear Mountain Bridge - Class B - bathing and general recreation.
>
> From the Bear Mountain Bridge to the New York-New Jersey State line opposite Hastings-on-Hudson - Class SB - recreation, fishing and bathing.

From the New York-New Jersey State line to the Battery - Class I - fishing.

The classifications from Troy to Bear Mountain Bridge were adopted in 1954. Those from Bear Mountain Bridge to the Battery were adopted early in 1965.

In December 1964, classifications were adopted by the New York State Water Resources Commission for New York Bay and Raritan Bay, which included the Kill Van Kull, Harlem River, and Lower East River subbasins. These official classifications are as follows:

Upper New York Bay - Class I - fishing.

Kill Van Kull - Class II - water not primarily for recreational purposes, shellfish culture or development of fish life.

Lower East River (except for small sector at its southern end) - Class II - water not primarily for recreational purposes, shellfish culture or development of fish life.

Harlem River from junction with Lower East River to Washington Bridge - Class II - water not primarily for recreational purposes, shellfish culture or development of fish life.

Harlem River from Washington Bridge to junction with the Hudson River - Class I - fishing.

Classification by the Interstate Sanitation Commission, adopted in 1936, established Class A waters, for recreational use, from the Bear Mountain Bridge to the area of the George Washington Bridge on the Hudson River, and the Washington Bridge on the Harlem River. The waters south of these points to the Narrows and the Outerbridge on the Arthur Kill were classified as Class B, non-recreational waters.

Status of Programs

Under the comprehensive plan adopted in 1955 by New York State for the upper Hudson River, a total of 17 municipalities, 20 industries, and 10 institutions, representing 370,000 people, were required to commence abatement facilities of their pollutional discharges. Of the municipalities named, three have constructed and are operating primary treatment plants or additions to then existing, but inadequate plants. This represented a net reduction of 14 percent of the raw municipal sewage discharging in 1955. Three more municipalities, representing 13 percent of the municipal discharges, have plans for treatment. Additionally, New York State recently inaugurated a new comprehensive pollution control program which includes fiscal incentives for planning construction and operation of sewage treatment works. The keystone of this program is the billion dollar bond issue to be presented to the electorate in November. Coupled with this is an enforcement program under which in September 1965, the New York State Health Department initiated legal action against six municipalities, with a combined population of about 250,000, and five industries discharging to this section of the Hudson River.

In 1947, the Interstate Sanitation Commission and New York City entered upon a "Consent Order" agreement. There were two major provisions to the consent order:

1) A first phase construction to end the discharge of raw sewage to recreational waters by 1954; and

2) to treat all of the sewage and other polluting wastes from New York City by December 31, 1959.

In November 1954, New York City submitted a time schedule for the second phase of the program, requesting an extension of time for completion from 1959 to 1964. The Commission issued a new order in 1957 fixing a progress schedule and extending the time for completion of the entire New York City program from 1959 to December 31, 1967. At present it appears that the 1967 deadline may not be met.

A major source of pollution in the New York Harbor area is the discharge of primary treated sewage from the Passaic Valley Sewage Treatment Plant. The Tri-State Compact specifically removes this plant from the jurisdiction of the Interstate Sanitation Commission provided the following conditions be met:

(1) There will be absence in the New York Bay of visible suspended particles coming from the Passaic Valley sewage.

(2) There will be absence of deposits objectionable to the Secretary of War of the United States in the New York Bay coming from the Passaic Valley sewage.

(3) There will be absence in the New York Bay and its vicinity of odors due to the putrefaction of organic matters contained in the Passaic Valley sewage thus discharged.

(4) There will be a practical absence on the surface of New York Bay of any grease or color due to the discharge of the Passaic Valley sewage at the dispersion area or elsewhere.

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(5) There will be no injury to the public health which will be occasioned by the discharge from the said sewer into the Bay of New York in the manner proposed and no public or private nuisance will be created thereby.

(6) The absence of injurious effect from said sewage discharge, upon the property of the United States situated in the Harbor of New York.

(7) The absence of reduction in the dissolved oxygen contents of the waters of New York Bay, resulting from the discharge of Passaic Valley sewage, to such an extent as to interfere with major fish life.

From 1948 to 1956, the Passaic Valley Sewage Treatment Plant was exempt from the enforcement provisions of the Federal Water Pollution Control Act. It is believed, however, that at present the New Jersey State Health Department, the Interstate Sanitation Commission through the above-noted conditions of permit, and the Federal Government have sufficient jurisdiction to deal with the discharge from this plant.

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SOURCES OF WASTE

Municipal

The total oxygen demanding load discharged to the Hudson from all municipal sources is estimated to be equivalent to the waste from 10 million people. In the area considered, from Troy to the Narrows, there are 48 discharges of municipal wastes directly to the main stream of the river. In addition, there are 26 discharges to tributaries throughout the entire length which directly affect the main stream. Six municipal discharges receive secondary treatment, with a resultant effluent strength of 1,959,000 population equivalents. Forty-four discharges received primary treatment and the resulting effluent contributes 3,760,000 population equivalents to the stream. Raw sewage discharges having a population equivalent of 4,297,000 are added by 24 communities. A summary of these discharges is outlined in Table 6.

In the upper Hudson from Troy south to the Ulster County line, the majority of wastes are discharged as raw sewage, or with inadequate treatment as in the case of Albany. The P. E. discharged in the Albany-Troy-

Rensselaer area alone amounts to 250,000. Although most of the loadings on the Hudson system in the mid-river area, from approximately Kingston to Bear Mountain, receive primary treatment, the total P.E. to the river amounts to 143,000. In the more urbanized area of Westchester and Rockland Counties, where the majority of the sewage receives primary treatment, the total discharges to the stream amount to 353,000 P.E. In the lower section of the river, in the New York City area, there are large concentrations of untreated and treated municipal wastes. Figures 2a and 2b indicate the location of the various discharges to the lower section.

One activated sludge plant, at Owls Head, discharges to the Upper Bay. Pollutional discharges to the Hudson from the New York City line to the Narrows amount to 5,091,000 P.E. Because of the tidal nature of New York Harbor, wastes from the East River, the Harlem River, the Kill Van Kull, and Newark Bay, enter the lower Hudson and Upper Bay and increase its pollutional loading. 487,000 population equivalents come from the Newark Bay-Van Kull area, and 3,693,000 population equivalents are contributed from the East River and Harlem River areas. A section of the Bronx, bordering the Hudson River, more than two-thirds of the Borough of Manhattan, and large portions of the areas of Brooklyn and Staten Island, and a smaller portion of the Borough of Queens, tributary to the Hudson River system, are presently discharging raw sewage amounting to 3,920,000 P.E.

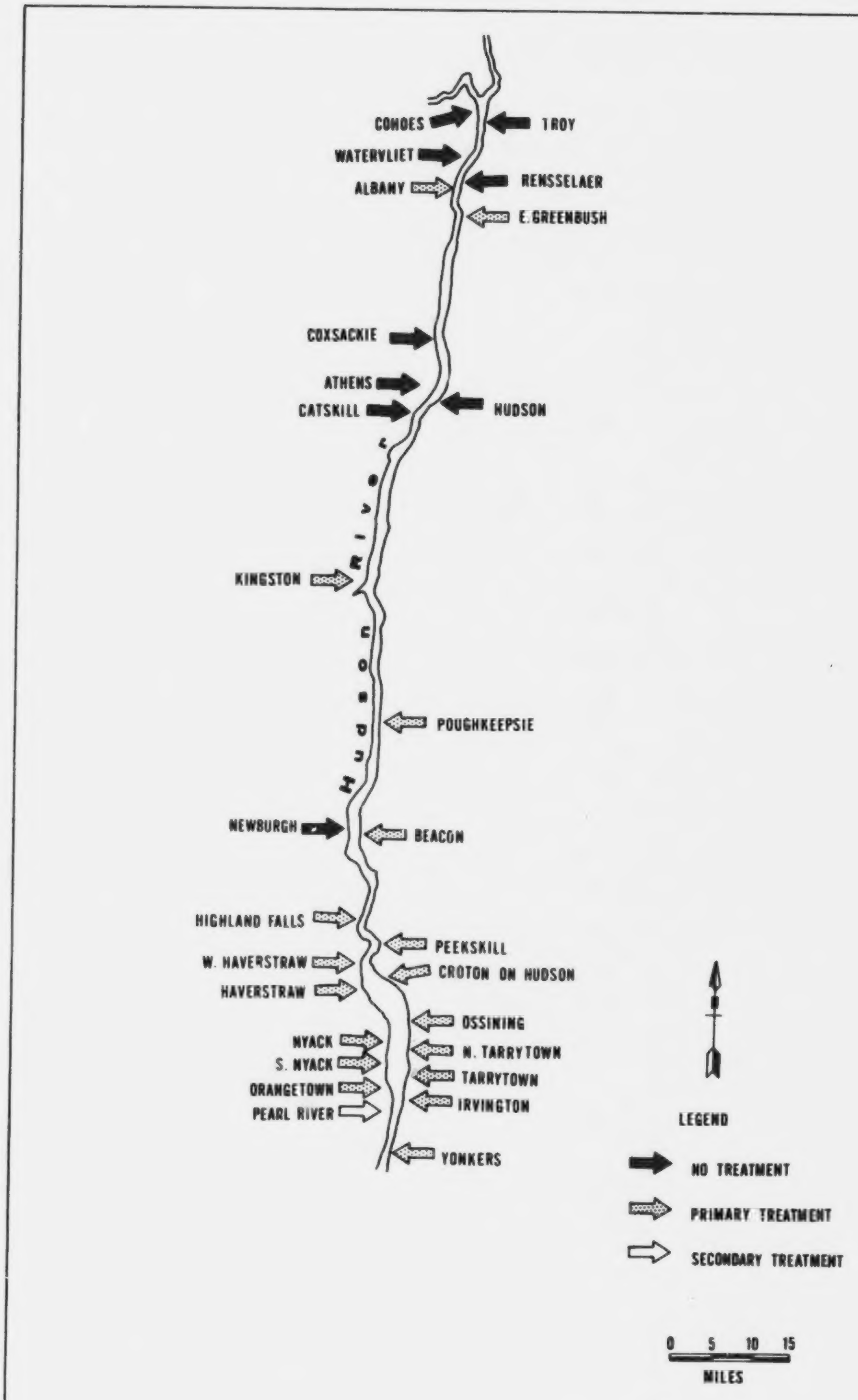
COHOES
TROY
WATERVLIET
ALBANY
RENSSELAER
E. GREENBUSH
COXSACKIE
ATHENS
CATSKILL
HUDSON
Hudson River
KINGSTON
POUGHKEEPSIE
NEWBURGH
BEACON
HIGHLAND FALLS
PEEKSKILL
W. HAVERSTRAW
CROTON ON HUDSON
HAVERSTRAW
OSSINING
NYACK
N. TARRYTOWN
S. NYACK
TARRYTOWN
ORANGETOWN
IRVINGTON
PEARL RIVER
YONKERS
LEGEND
NO TREATMENT
PRIMARY TREATMENT
SECONDARY TREATMENT
0
5
10
15
MILES

FIGURE 2a

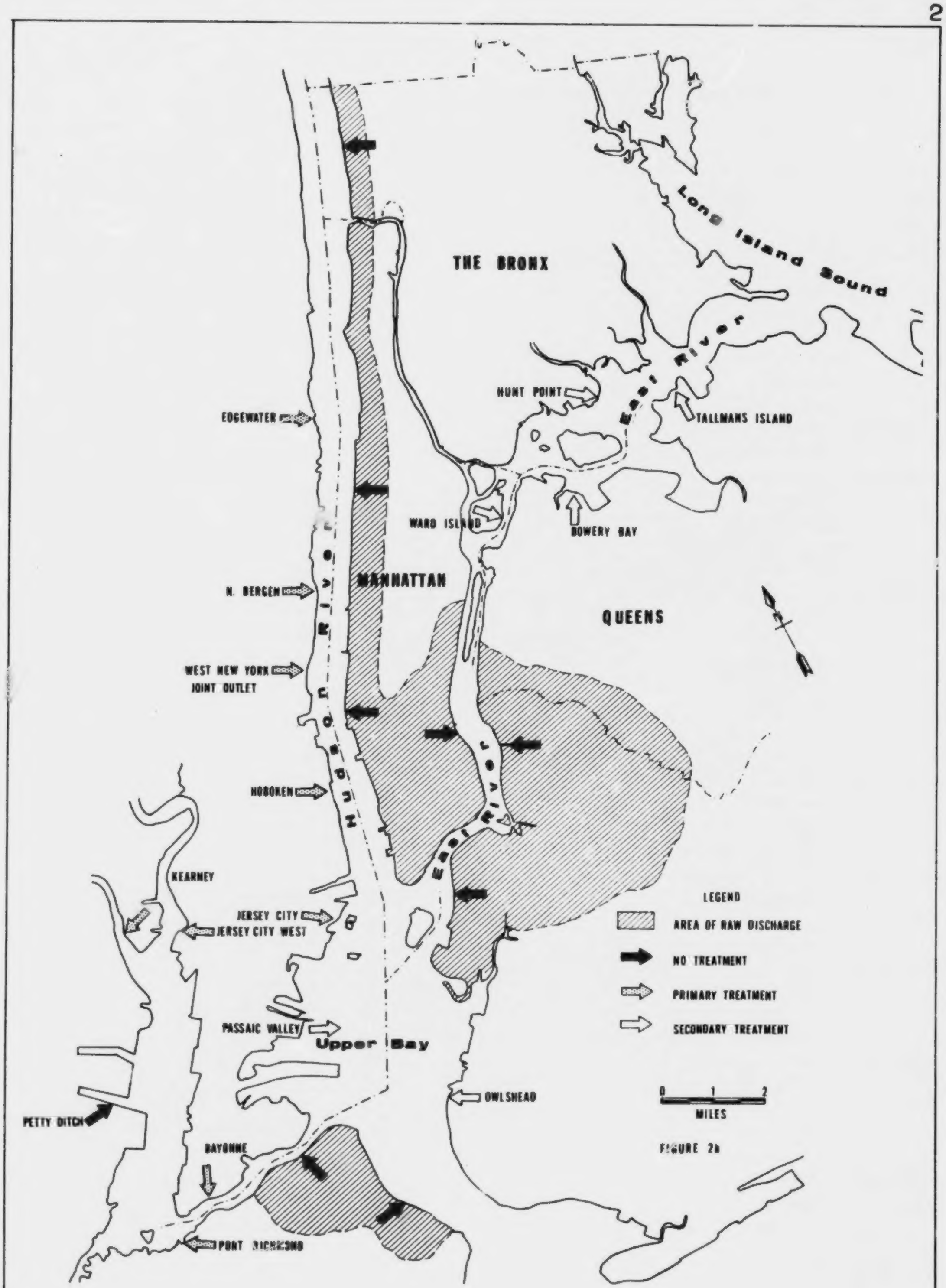
THE BRONX
Long Island Sound
East River
HUNT POINT
TALLMANS ISLAND
EDGEWATER
WARD ISLAND
BOWERY BAY
MANHATTAN
QUEENS
N. BERGEN
Hudson River
WEST NEW YORK JOINT OUTLET
East River
HOBOKEN
KEARNEY
JERSEY CITY
JERSEY CITY WEST
LEGEND
▨ AREA OF RAW DISCHARGE
NO TREATMENT
PRIMARY TREATMENT
SECONDARY TREATMENT
PASSAIC VALLEY
Upper Bay
OWLSHEAD
0 1 2
MILES
PETTY DITCH
BAYONNE
PORT RICHMOND

FIGURE 2b

Table 6

Municipal Waste Discharges to the Hudson River and Its Tributaries

River Miles No. Of Battery	Municipality	Population Tributary To Stream	Treatment	Estimated Flow MGD	Estimated Pop. Equiv.
151	Cohoes	20,129	None	2.00	20,130
151	Green Island	3,533	None	0.35	3,530
150	Troy	67,492	None	6.75	67,490
149	Watervliet	14,000	None	1.40	14,000
148	Menands	2,314	None	0.25	2,310
141	Albany	126,000	Primary	12.60	126,000
Tributary-	Patroons Creek				
	West Albany	550	None	.06	550
Tributary-	Unnamed				
	Colonie-Latham	2,600	Primary	.26	1,800
141	Rensselaer	10,506	None	1.05	10,500
139	East Greenbush	5,200	Primary	.52	3,600
135	Castleton-on-Hudson	1,752	None	.18	1,750
Tributary-	Coeymans Creek				
	Ravena	2,424	Primary	.24	1,600
	Coeymans	854	None	.09	850
122	Coxsackie	2,849	None	.28	2,850
116	Athens	1,754	None	.18	1,750
116	Hudson	11,075	None	1.11	11,075
110	Catskill	5,825	None	.58	5,825
104	Cementon	700	None	.07	700
Tributary-	Esopus Creek				
	Saugerties EBP	800	Primary	.08	550
	Saugerties DUP	1,600	Primary	.16	1,100
	Saugerties PP	1,500	Primary	.15	1,050
Tributary-	Stoney Creek				
	Tivoli	750	Primary	.08	525
Tributary-	Roundout Creek				
	Kingston	29,000	Primary	2.90	20,300
Tributary-	Twaalskill				
	Highland	3,000	Primary	.30	2,100
74	Poughkeepsie	38,330	Primary	3.83	26,830
74	Arlington Sewer Dist.-Poughkeepsie	6,155	Primary	.62	4,300
Tributary-	Wappinger Creek				
	Wappinger Falls	3,500	Primary	.35	2,450
60	Newburgh	32,000	None	3.20	32,000
60	Beacon	17,500	Primary	1.75	12,250
57	Cornwall	2,000	Primary	.20	1,400
Tributary-	Moodna Creek				
	New Windsor	6,250	Primary	.63	4,375
	Cornwall SD #1	2,500	Primary	.25	1,750

Table 6

Municipal Waste Discharges to the Hudson River and Its Tributaries (Cont'd)

River Miles No. of Battery	Municipality	Population Tributary To Stream	Treatment	Estimated Flow MGD	Estimated Pop. Equiv.
54	Cold Spring	2,083	None	.21	2,080
50	Highland Falls	4,470	Primary	.45	3,130
43	Peekskill	18,700	Primary	1.70	12,000
Tributary	- Minisceongo Creek				
	West Haverstraw	5,000	Primary	.80	8,800
36	Haverstraw	5,800	Primary	.40	4,200
36	Croton-on-Hudson	3,920	Primary	.40	3,800
32	Ossining - Liberty St.	1,600	Primary	.30	1,100
	Ossining - Water St.	15,000	Primary	1.10	10,480
31	Briarcliff Manor	1,700	Primary	.20	1,200
	North Tarrytown	8,800	Primary	1.20	8,700
29	Upper Nyack	1,000	Primary	.10	500
28	Nyack	6,000	Primary	.80	10,000
28	Tarrytown	11,100	Primary	1.30	9,700
27	South Nyack	3,100	Primary	.30	2,400
25	Piermont	1,800	Primary	.20	1,700
25	Sewer Dist. #3 (Pearl River)	3,600	Secondary	1.90	10,700
25	Sewer Dist. #2 (Orange Town)	2,500	Primary	.50	1,800
24	Irvington	5,500	Primary	.70	4,600
16	Yonkers	440,000	Primary	61.00	261,500
14	Bronx-Riverdale	30,000	None	3.00	30,000
Tributary	- Harlem-Upper East River				
	Northern Manhattan	40,000	None	6.00	40,000
	Manhattan-Wards Island	1,470,000	Secondary	215.00	418,100
	Bronx-Hunts Point	770,000	Secondary	130.00	473,700
	Queens-Bowery Bay	750,000	Secondary	100.00	340,300
	Queens-Tallmans Island	251,000	Secondary	38.00	221,000
9	Edgewater, N. J.	21,700	Primary	1.70	15,500
8	Manhattan (West Side)	671,000	None	230.00	1,500,000*
7	North Bergen	14,700	Primary	.70	4,600
5	West New York	50,000	Primary	6.70	79,000
2	Hoboken	70,000	Primary	8.80	81,200
Tributary	Lower East River) Manhattan (East Side)) Brooklyn)	2,200,000	None	310.00	2,200,000*

*Includes transient working population.

Table 6

Municipal Waste Discharges to the Hudson River and Its Tributaries (Cont'd)

River Miles No. of Battery	Municipality	Population Tributary To Stream	Treatment	Estimated Flow MGD	Estimated Pop. Equiv.
	Jersey City-East	180,000	Primary	31.70	230,200
	Passaic Valley	1,150,000	Primary	230.00	2,500,000
	Red Hook	130,000	None	20.00	130,000
Tributary-	Kill Van Kull-Newark Bay				
	St. George-West	25,000	None	2.50	25,000
	Port Richmond	60,000	Primary	6.70	55,200
	Bayonne	75,000	Primary	6.70	58,600
	Newark Bay-Petty Ditch	170,000	None	30.00	170,000
	Jersey City-West	120,000	Primary	12.00	170,600
	Kearney	117,000	Primary	2.20	8,000
	Staten Island-St. George-East	25,000	None	2.50	25,000
	Brooklyn-Owls Head	750,000	Secondary	98.00	495,000

Estimates of flow and population equivalents for discharges north of the Bear Mountain Bridge were from New York State Health Department Listings. For areas below Bear Mountain Bridge, data from the Interstate Sanitation Commission was used.

Paul De Falco, Jr.

Thirty-three percent of the population equivalents discharged to the Hudson River are from the waste discharges in New Jersey; the remaining 67 percent results from discharges from New York. The major source of waste from New Jersey is the Passaic Valley Sewerage Commission outfall located at Robbins Reef in the Upper Bay. This source discharges approximately 2,500,000 population equivalents. An additional major source of waste is the discharge of raw sewage from the Petty Ditch area into Newark Bay. The Petty Ditch discharges approximately 170,000 population equivalents of raw sewage from a section of Newark. Construction is currently under way on an intercepting sewer which will divert the waste from the Petty Ditch area to the Passaic Valley Sewage Treatment Plant. Construction is also under way on interceptors in the lower half of Manhattan and a major treatment facility at Newton Creek in Brooklyn which will service the intercepted area. The Newton Creek facility is expected to be in operation in 1967. Sewage is presently being discharged untreated.

Public Health Service grants for construction of sewage facilities in the area under consideration are summarized in Table 7.

Table 7

Public Health Service Grants for Construction of Sewage Treatment Facilities
For Communities South of Albany, N. Y. that discharge to
the Hudson River

Project Name	Number	Date of Offer	Type*	Total Cost	Eligible Cost	Grant	Status
New Jersey							
North Bergen	WPC-NJ-14	12/30/57	Primary STP	$855,000	$855,000	$250,000	Completed June 63
Guttenberg	WPC-NJ-32	11/6/61	Intercepting Sewer (Treatment at No. Bergen Plant)	83,200	83,200	24,469	Construction started 6/16/65
Weehauken-Union City	WPC-NJ-69	2/12/63	Intercepting Sewer (Primary treatment at Hoboken STP)	543,000	543,000	110,700	Completed 1964
New York							
Bethlehem	WPC-NY-3	2/27/57	Primary STP	260,600	260,600	70,660	Completed 1/13/59
East Greenbush	WPC-NY-29	5/20/57	Additions to Primary STP	52,144	52,144	15,643	Completed 4/2/58
Greenport	WPC-NY-38	9/13/57	Primary STP	204,900	204,900	70,566	Completed 1/7/60

* STP - Sewage Treatment Plant

Table 7

Public Health Service Grants for Construction of Sewage Treatment Facilities for Communities South of Albany, N. Y. that discharge to the Hudson River (Cont'd)

Project Name	Number	Date of Offer	Type*	Total Cost	Eligible Cost	Grant	Status
New York (Cont'd)							
Hudson	WPC-NY-258	4/20/65	Primary STP	868,400	851,700	255,510	Not yet advertised for bids
Poughkeepsie, Arlington Sewer District	WPC-NY-11	3/12/57	Primary STP	762,700	762,700	228,814	Completed 11/5/59
Poughkeepsie	WPC-NY-22	3/21/57	Primary STP	1,425,000	1,425,000	250,000	Completed 10/17/59
Wappingers Falls	WPC-NY-46	12/13/57	Primary STP (Effluent discharged to Wappingers Creek, 1-1/3 miles from Hudson River)	154,676	154,676	46,402	Completed 6/10/60
City of Beacon	WPC-NY-75	4/16/59	Primary STP	1,126,300	1,126,300	250,000	Completed 1962
City of Beacon	WPC-NY-148	12/19/61	Intercepting Sewer (Discharge to STP built under NY-75	350,000	339,800	101,940	Completed 10/64

*STP - Sewage Treatment Plant

Table 7

Public Health Service Grants for Construction of Sewage Treatment Facilities for Communities South of Albany, N. Y. that discharge to the Hudson River (Cont'd)

Project Name	Number	Date of Offer	Type*	Total Cost	Eligible Cost	Grant	Status
New York (Cont'd)							
Highland Falls	WPC-NY-47	9/11/59	Primary STP and additions to an existing Primary Plant	182,134	182,134	54,640	Completed 11/14/62
Newburgh	WPC-NY-53	8/17/59	Primary STP	2,760,000	1,276,800	250,000	Authorized to Advertise 6/5/63 No Bids Taken as Yet
New Windsor	WPC-NY-146	11/22/61	Additions to a Primary STP	125,000	97,850	29,355	Completed 11/30/64
Village of Cold Srpings	WPC-NY-244	11/19/64	Primary STP	519,830	481,000	144,300	Authority to Advertise 6/15/65
Orangetown	WPC-NY-69	9/26/58	Primary STP	535,850	535,850	160,755	Completed 4/12/61

* STP - Sewage Treatment Plant

Table 7

Public Health Service Grants For Construction of Sewage Treatment Facilities for Communities South of Albany, N. Y. that Discharge to the Hudson River (Cont'd)

Project Name	Number	Date of Offer	Type*	Total Cost	Eligible Cost	Grant	Status
New York (Cont'd)							
Orangetown	WPC-NY-176	12/19/62	Interceptors and Pumping Stations Treatment (Primary) at STP built under NY-69 and at another primary STP at Pearl River	1,871,800	612,700	183,810	85% Complete 11/64
Piermont	WPC-NY-9	5/7/58	Pumping station, Force main, and Interceptor (treatment to be at Orangetown Plant)	451,031	357,900	107,370	50% Complete 8/65
Nyack	WPC-NY-160	2/23/62	Alterations to existing primary STP	19,140	19,140	5,741	Complete 5/18/62
Town of Lloyd	WPC-NY-112	10/25/60	Alterations to existing Primary STP	130,500	127,515	38,254	Completed 8/1/64

*STP - Sewage Treatment Plant

Table 7

Public Health Service Grants For Construction of Sewage Treatment Facilities for Communities South of Albany, N. Y. that Discharge to the Hudson River -(Cont'd)

Project Name	Number	Date of Offer	Type*	Total Cost	Eligible Cost	Grant	Status
New York (Cont'd)							
Kingston	WPC-NY-121	7/3/61	Interceptor and additions to existing primary STP	282,300	282,300	84,690	Completed 6/1/65
Yonkers Westchester County)	WPC-NY-50	9/16/58	Primary STP	10,500	4,840	250,000	Completed 8/60
Peekskill	WPC-NY-88	3/24/60	Interceptor Sewer, Pumping station & Force Main (Primary treatment at existing STP	671,300	550,000	165,000	61% complete on 7/12/65
Buchanan	WPC-NY-155	1/18/62	Secondary STP	778,800	364,042	109,212	Completed 9/63
Buchanan	WPC-NY-247	4/15/65	Pumping Station, Force Main and Interceptor (Treatment at Buchanan STP)	187,500	175,500	52,650	Under Construction 4/19/65

*STP - Sewage Treatment Plant

Paul De Falco, Jr.

Industrial Waste Discharges

The listing of waste discharges to the Hudson, prepared by the New York State Health Department, indicated that there are at least 53 known discharges of industrial wastes to the Hudson River or its immediate tributaries. A list of industrial waste discharges in New Jersey is not available from the official water pollution control agencies concerned to the best knowledge of the Federal investigators. Similarly, specific information on volume and strength of industrial wastes in both New York and New Jersey discharged to the Hudson River or its tributaries was not available. In the Albany area there is a concentration of paper manufacturing plants and meat packing houses. Both of these industry groups are normally known to contribute large organic loadings to the stream. Table 8 summarizes the information provided by the New York State Health Department. It indicates that industry is equally distributed down the length of the stream and the sizes of the industries, in many cases, are significant, as can be noted from the number of employees shown in Table 8. The contributions from these industries to the water pollution problems of the Hudson are indicated in the summary of the waste characteristics.

Paul De Falco, Jr.

Industries located on the tributaries in many cases cause problems on the main stream of the Hudson. Industrial wastes in the Moodna Creek area have been brought to the attention of the Public Health Service on several occasions, as creating a public nuisance.

Table 8

Industries Discharging Wastes to the Hudson River

River Miles	Company	Employees	Waste Characteristics
151-133	ALBANY COUNTY		
	Manning Paper	800	Paper wastes (fiber, color, organic solids)
	Alleghany-Ludlum Corp.	1750	Oil and Discoloration
	Delaware & Hudson	--	Oil
	Tobin Packing Co.	1050	Meat processing (organic, color, solids)
	Mohawk Paper Co.	375	Solids, fiber, discoloration
	Carr Packing Co.	90	Blood and washings
	Behr-Manning	1750	Acids and Organics
151-133	RENSSELAER COUNTY		
	F.C. Huyck & Sons	400	Felt and fabrics (fiber, colors, solids)
	Fort Orange Paper Co.	400	Paper wastes (fibers, colors, organic, solids, chemicals)
	Loeffel Waste Oil Co.	--	Oil sludge
	Ludlow Valve Co.	250	Metal processing (acids, alkalies, solids)
	Winthrop-Stearns Corp.	1350	Drug manufacturing (chemicals, colors, solids)
	General Analine & Film	800	Dye wastes (solids, color, chemicals)
	Wood-Flong Corp	--	Paper wastes (fibers, colors, organic, solids, chemicals)
	Cuett-Peabody & Co.	1220	
133-101	COLUMBIA COUNTY		
	Columbia Corp.	190	Paper wastes (color, solids, organic)
	Prince-High Rock Mills	--	BOD and discoloration
	Clermont Fruit Packers	--	Solids and discoloration
	Northeast Fruit Growers Corp.	--	Solids and odors
101-76	DUTCHESS COUNTY		
	Texaco Research Center	1100	Discoloration from petroleum wastes
	Orchard Hill Farms	--	Septic system overflow
	DeLaval Separator	850	No present problem
	Western Lithograph Co.	1000	Present sewage system needs updating

Table 8

Industries Discharging Wastes to the Hudson River (Cont'd)

River Miles	Company	Employees	Waste Characteristics	
101-76	ULSTER COUNTY			
	Roundout Paper Mills	84	Color, solids, turbidity	
	Martin Contine Coated Paper Co.	--	Color from dye and finishing wastes	
	Ulster County Tissue Mills	--	Color from dye and finishing wastes	
	Dal Vechia & Sons	15	Solids from food processing	
	Hudson Valley Apple Prod.	45	Solids and spent caustic solutions	
	Hudson Valley Wine Co.	14	Volatiles from evaporators	
76-43	ORANGE COUNTY			
	Ferndale Farms	--	Milky discoloration	
	Mack Brothers	--	Waste treatment system failing	
	Monroe Laundry	--	Greyish Discoloration	
	Majestic Weaving	--	Fabric process and dye wastes	
	Am. Felt. Co.	425	Color from fabric processing and sewage	
	National Gypsum Co.	65	Discoloration and turbidity from processing	
43-21	ROCKLAND COUNTY			
	Continental Can Co., Inc.	1150	White water and equipment wash-up	
	Kay-Fries Chemicals, Inc.	225	Dark gray discoloration	
	Elk Piece Dye Corks, Inc.	150	Dye wastes	
	United Wire Goods	75	Plating rinse waters	Receiving stream blue discoloration
	E&S Finishing Co.	78	Dye rinsing	
	Piermont Finishing Co.	--	Dye rinsing	
	Head Textile Printers	--	Dye rinsing	
	New York Trap Rock Corp.	457	Orange discoloration and turbidity	
43-12	WESTCHESTER COUNTY			
	Refined Syrups & Sugars, Inc.	600	Turbidity, color, sludge from sewage and wastes	
	Chev. Div. of General Motors, Inc.	4000	Color and oil from metal washing and paint spraying	
	Hudson Wire Co.	118	Plating and pickling wastes	
	Barlow Chemical Corp.	--	Process wastes from production of synthetic chemicals	
	New York Central RR Co.	--	Oil filter cleaning and shop wastes	

Table 8

Industries Discharging Wastes to the Hudson River (Cont'd)

River Miles	Company	Employees	Waste Characteristics
	WESTCHESTER COUNTY (Cont'd)		
	Standard Coated Products	200	Turbidity, color and sludge from sewage and wastes
	Standard Brands, Inc.	425	Color from yeast fermentation and vinegar
	Cortland Stone Co.	--	Turbidity from dust control
	The Ednalite Optical Co.	68	Turbidity and oil from grinding processes
	Anaconda Wire & Cable Corp.	5300	-
	Fords Steel Products Corp.	38	-

Federal Installations

The Federal installations discharging wastes to surface water within the discussion area are shown in Table 9. In some cases the discharge is from an installation providing treatment of a portion of the total waste generated. Federal installations that discharge to municipally-owned and operated sewerage systems have not been listed in this report; however, they do represent the major method of discharge in the conference area. Treatment of a Federal waste discharged to a municipally-operated sewerage system becomes the direct responsibility of the municipality through governing local and State health agencies. In the table several installations discharging both direct to the surface waters and to the city sewers are listed.

Present plans call for the connection of the Staten Island Marine Hospital and the Governor's Island installations to municipal sewer systems. Plans are presently being processed for a treatment plant for the industrial waste from Watervliet Arsenal. The installations at St. George, the Brooklyn Naval Shipyard, and Brooklyn Army Terminal, are being deactivated. In summary, there are 15 Federal installations discharging 6.3 mgd without treatment and there are 8 installations discharging 1.2 mgd with treatment. Two installations discharge 300,000 gpd to city sewers. The total discharge from Federal installations is 8 mgd or less than 1 percent of the total waste discharge to the Hudson River.

Institutions

There are a number of public institutions located along the banks of the Hudson River, many of which discharge their wastes to the stream. There are numerous units ranging in size up to establishments such as Letchworth Village and Sing-Sing Prison. The discharges from institutions normally closely approximate the discharge from municipalities in composition and pollutional effect.

Storm Water Overflow

Many of the sewerage systems in the Hudson River Valley are composed of combined sewers. Historically, the generally accepted engineering practice in this country has been to design combined sewers to handle storms two to three times the dry weather flow. When the flow exceeds this, a combination of sewage and storm water is by-passed directly to the receiving water. This phenomenon which occurs as often as once a week during the summer months, when normal rainfall patterns exist, results in substantial organic loadings being discharged to the stream. In the upper East River area, there are more than 60 combined outlets serving the Bronx and Queens. This area is completely sewered to modern sewage treatment plants providing secondary treatment. The effect of the storm water overflows is to undo the extensive treatment and subsequent removal of waste materials that the sewage treatment plants were constructed to accomplish. Combined sewers exist in many other areas of the Hudson River system. Loadings from these sewers are not available.

Table 9
FEDERAL INSTALLATIONS DISCHARGING TO SURFACE WATERS WITHIN THE CONFERENCE AREA

INSTALLATION	AGENCY	EST. VOLUME GPD		TREATMENT	STREAM
		SANITARY	INDUSTRIAL		
Troy Lock & Dam	CofE	260		None	Hudson
St George Base	C.G.	80,000		None	N.Y. Harbor
Robbins Reef Lt. Sta.	C.G.	120		None	N.Y. Harbor
S.I. Marine Hosp.	PHS	177,000		City Sewer	
			19,000	None	N.Y. Harbor
Hudson Reserve Fleet	Maritime Ad.	2,500		None	Hudson
Naval Shipyard-Bklyn	Navy	750,000		None	East
			4,700,000	None	East
Medical Supply Agency	GSA	80,000		None	N.Y. Harbor
Bklyn Army Terminal	Army	348,000		Sewer	
		112,000		None	N.Y. Harbor
Governors Island	Army	357,000		None	N.Y. Harbor
Statue of Liberty	N.P.S.	10,000		Primary	N.Y. Harbor
Governors Isl. Light	C.G.	100		None	N.Y. Harbor
U.S. Military Academy	Army	758,000		Primary	Hudson
Training Camps	Army	94,000		Primary	Popolopen Crk.
Golf Clubhouse	Army	1,300		Primary	Highland Br.
Qtrs 148,394,609	Army	800		None	Hudson
U.S. Storehouse-Albany	CofE	100		None	Patroon Crk.
Watervliet Arsenal	Army	102,400		City Sewer	
			248,000	None	Hudson
No. Brother Isl. Lt. Sta.	C.G.	100		None	East
Throggs Neck Lt. Sta.	C.G.	100		Primary	East
VA Hosp - Castle Pt.	V.A.	81,000		Primary	Hudson
VA Hosp - Montrose	V.A.	166,000		Primary	Hudson
Bayonne Supply Depot	Navy	70,000		Primary	N.Y. Harbor

Table 10

INSTITUTIONS DISCHARGING WASTES TO THE HUDSON RIVER AND ITS TRIBUTARIES

INSTITUTIONS	POPULATION TRIBUTARY TO STREAM	TREATMENT	DISCHARGES FLOW MGD	ESTIMATED P E
N.Y. State Hosp. - Poughkeepsie	6,000	Primary	0.60	4,200
N.Y. State Hosp. - Matteawan	3,000	Primary	0.30	2,100
N.Y. State Hospital - Rockland	500	Primary	0.05	350
Letchworth Village	4,000	Primary	0.40	2,800
Palisades Interstate Park	5,000	Primary	0.10	3,500
Sing Sing State Prison	3,000	Primary	0.30	2,100
St. Joseph's Home	500	None	0.05	500
N.Y. Military and Naval Affairs	2,400	Primary	0.24	1,680

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EFFECTS OF POLLUTION ON WATER QUALITY AND USES

Introduction

Sewage and many industrial wastes contain organic matter that decomposes and exerts a demand on the oxygen dissolved in the receiving waters. In the process of degradation, the dissolved oxygen is reduced below its normal level in satisfying the demand of the decomposing organic material. High concentrations of decomposable material will cause a sharp reduction of the oxygen in the stream with a resulting reduction or elimination of desirable aquatic life, including fish. Wastes strong enough to completely deplete the dissolved oxygen will cause offensive odors. Dissolved oxygen, therefore, is universally regarded as one of the criteria for judging water quality.

A generally accepted requirement throughout the country for maintenance of a good quality water for protection of aquatic life and other uses is five milligrams of oxygen dissolved in each liter (mg/l). A liter is approximately one quart of water. Because of the tidal characteristics and mixing of the waters within the conference area, a lower quality of water in one section has a direct effect on other areas, including those with a higher quality water.

Municipal waste effluents contain enormous numbers of intestinal bacteria, among which there are usually pathogenic organisms that cause gastro-intestinal diseases such as diarrhea and typhoid fever. Pathogenic bacteria can cause illness in persons who contact or ingest waters containing them. Effective waste treatment and disinfection can reduce or eliminate the density of pathogenic bacteria and the resulting hazard of contracting diseases from waste discharges.

Bacteria of the coliform group typically occur in excreta or feces and can readily be detected. Coliform bacteria, usually harmless in themselves, are always present in river water receiving municipal wastes and have been used as an indication of the probable presence of pathogenic organisms. The possibility of pathogens being present in the absence of coliform organisms is extremely remote. The coliform group has been used by numerous State and interstate pollution control agencies as a basis for water quality objectives for various water uses. For recreational uses, where body contact is present, e.g. swimming or water skiing, it has been the practice of most State water pollution control agencies to subscribe to a requirement not to exceed a mean value of coliform density of 1,000 organisms in 100 milliliters, or about four ounces of water (1000/100 ml). Because of the intermixing through tidal currents between recreational and non-recreational waters, waste discharges affect areas other than that to which they are discharged. In no instance should discharges to non-contact recreational waters be of such quality as to adversely affect waters of higher use.

Unpolluted water supports a diverse population of bottom organisms and fish. Two major changes may occur in the biological populations of rivers as the result of the discharge of wastes: (1) There will be an increase in the number of pollution-tolerant organisms with a corresponding decrease in the numbers and species of clean-water-indicator organisms; (2) the discharge of wastes may be so great or may be of a toxic nature such that all bottom-dwelling organisms are destroyed, leaving a complete absence of biological life. Biological evaluations thus are a valid indicator of the degree of water pollution.

Effects of Pollution

Water quality in the Hudson River system is the result of the numerous discharges of untreated and inadequately treated wastes from municipalities and industries from the Federal Dam and Lock at Troy to the Narrows.

Dissolved Oxygen

On the basis of the criteria of dissolved oxygen content, the river, during a survey this August, demonstrated the impact of the wastes discharged to it (Figure 3). For a distance of some 60 miles downstream from the Albany-Troy-Rensselaer area, depressed oxygen conditions existed. For 20 miles, from Albany downstream, the river was essentially devoid of dissolved oxygen.

The river never returned to a state of relatively complete oxygen saturation until it reached the ocean in the New York Bight. This was the result of additional waste discharges downstream which were sufficient to prevent full recovery. The maximum levels reached during the August survey were 7 mg/l in the vicinity of the Tappan Zee Bridge. At this point the effect of the discharges in the New York Metropolitan Area, carried upstream by tidal currents, further depressed the oxygen levels to less than 4 mg/l. In the immediate city area, from the George Washington Bridge to the Narrows, dissolved oxygen levels of less than 4 mg/l generally prevailed. Previous surveys of October 1963 and July 1965 by the Public Health Service present similar patterns of oxygen content.

An examination of the extensive records maintained by the New York City Department of Public Works indicates that the levels of oxygen found in August of this year are not significantly different from those that have prevailed over the summers of the past ten years in this general area (Figure 4). Dissolved oxygen in the metropolitan area, because of the influx of sea water, shows considerable stratification, with much lower values recorded for the underlying waters of the area. Values of approximately 5 mg/l on the surface to approximately 3 mg/l on the bottom where recorded in the Mount St. Vincent area at approximately the New York City line. The low point in the Hudson River proper appears to exist in the area between the Battery and 42nd Street, where surface values of approximately 3 mg/l were recorded and underlying water values of 2. to 2.5 mg/l have been recorded.

DISSOLVED OXYGEN—HUDSON RIVER
AUGUST 22–24, 1965

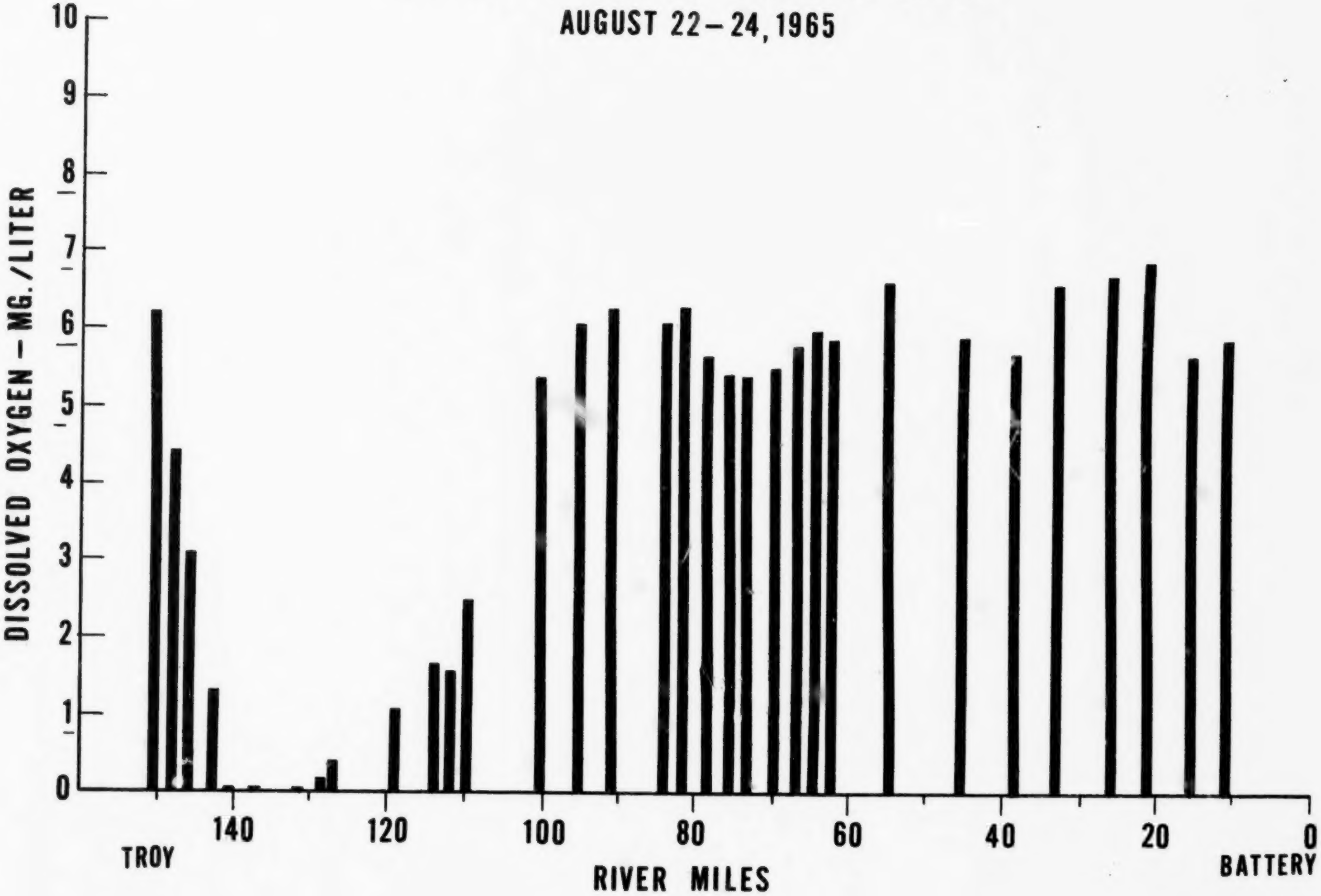

FIGURE 3

DISSOLVED OXYGEN—NEW YORK HARBOR

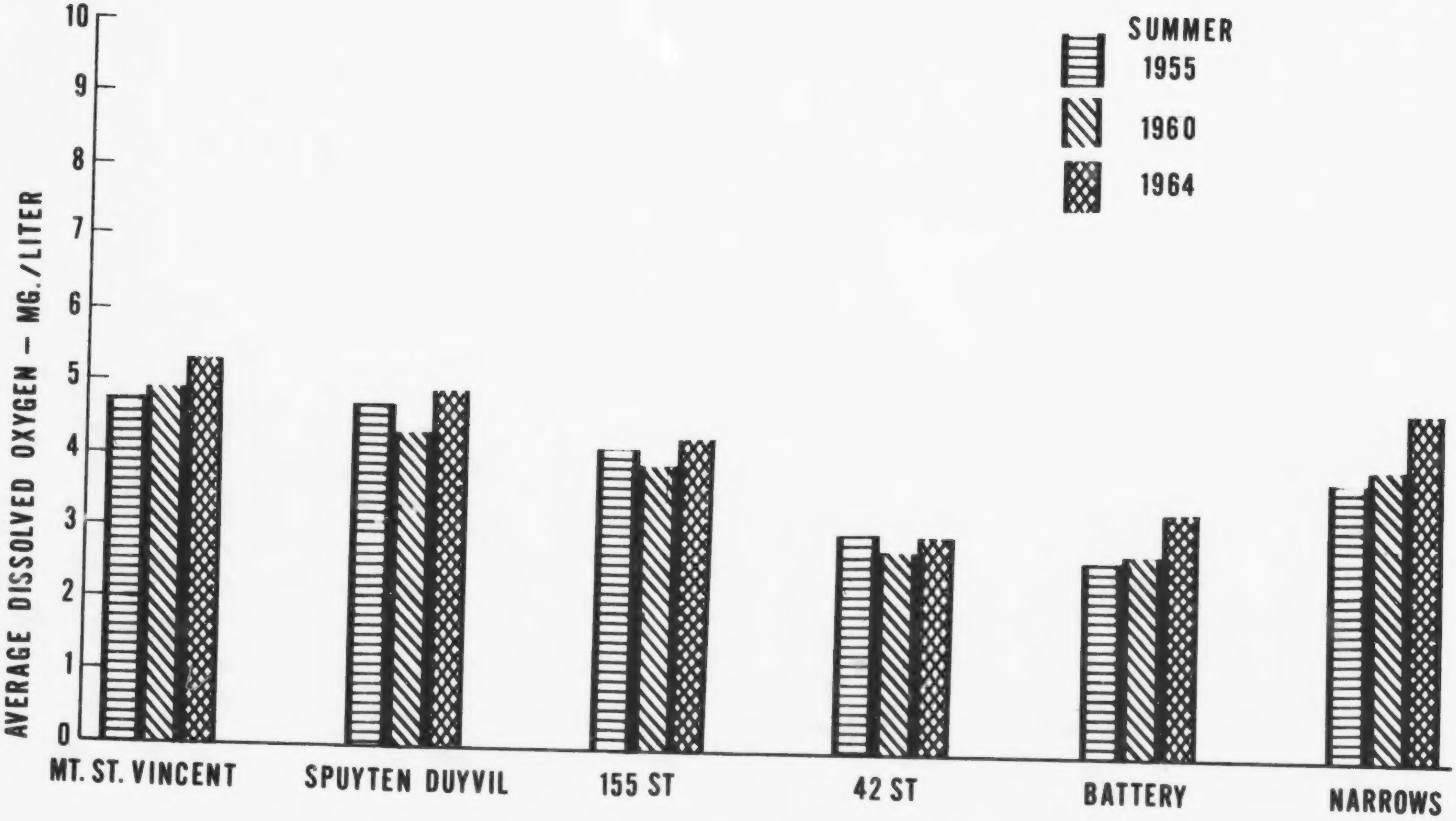

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FIGURE 4

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Dissolved oxygen in the Hudson River varies on the average from about 4.5 mg/1 at the city line to about 3.0 mg/1 at the Battery, and recovers to about 4.0 mg/1 at the Narrows. In general, mean values during warm weather periods are less than 4.0 mg/1 throughout the entire section under consideration. The effect of the discharge at the Passaic Valley outfall was demonstrated by data collected by the Interstate Sanitation Commission in 1958. At that time, it became necessary for Passaic Valley to bypass their sewage without treatment for a period of time. During this time, dissolved oxygen values throughout the Bay were reduced about 1.3 mg/1, with a low mean value of 2.3 mg/1 resulting at the Battery.

Oxygen levels in the major tributary areas of New York Harbor similarly showed severely depressed conditions due to the large volume of urban wastes discharged to the system in this area.

The untreated wastes discharged into the lower East River from Manhattan Island below 72nd Street and from Brooklyn south of Newtown Creek have resulted in a foul-smelling, unesthetic and thoroughly degraded waterway. The dissolved oxygen content from the Battery to Ward's Island is less than 3.0 mg/1, with lower limits observed at less than 0.5 mg/1 at Newtown Creek. When the proposed Newtown Creek treatment plant is placed into operation, the treated sewage will be discharged right at the present low point for dissolved oxygen just opposite the United Nations Building.

Vast quantities of sludge deposits on the bottom of the river also contribute to the dissolved oxygen degradation and to the highly unsightly condition. The lower East River is a long way from attaining 5.0 mg/1 and, in fact, cannot even meet the Interstate Sanitation Commission standard of 30 percent saturation. During warm weather, 30 percent saturation equals a dissolved oxygen content of about 2.2 mg/1. The upper East River north of Ward's Island has been described by the State of New York as polluted throughout its entirety. Dissolved oxygen during the summer varies from about 0.7 mg/1 near Ward's Island to about 2.5 to 3.0 mg/1 at Throgs Neck, just before entry to Long Island Sound.

In the Harlem River area dissolved oxygen ranges from a high of 3.5 mg/1 at Spuyten Duyvil, where the Harlem joins the Hudson, to 1.5 mg/1 at the East River. Polluted waters from the Harlem River will penetrate to the Hudson River when the currents are flowing in a northerly direction.

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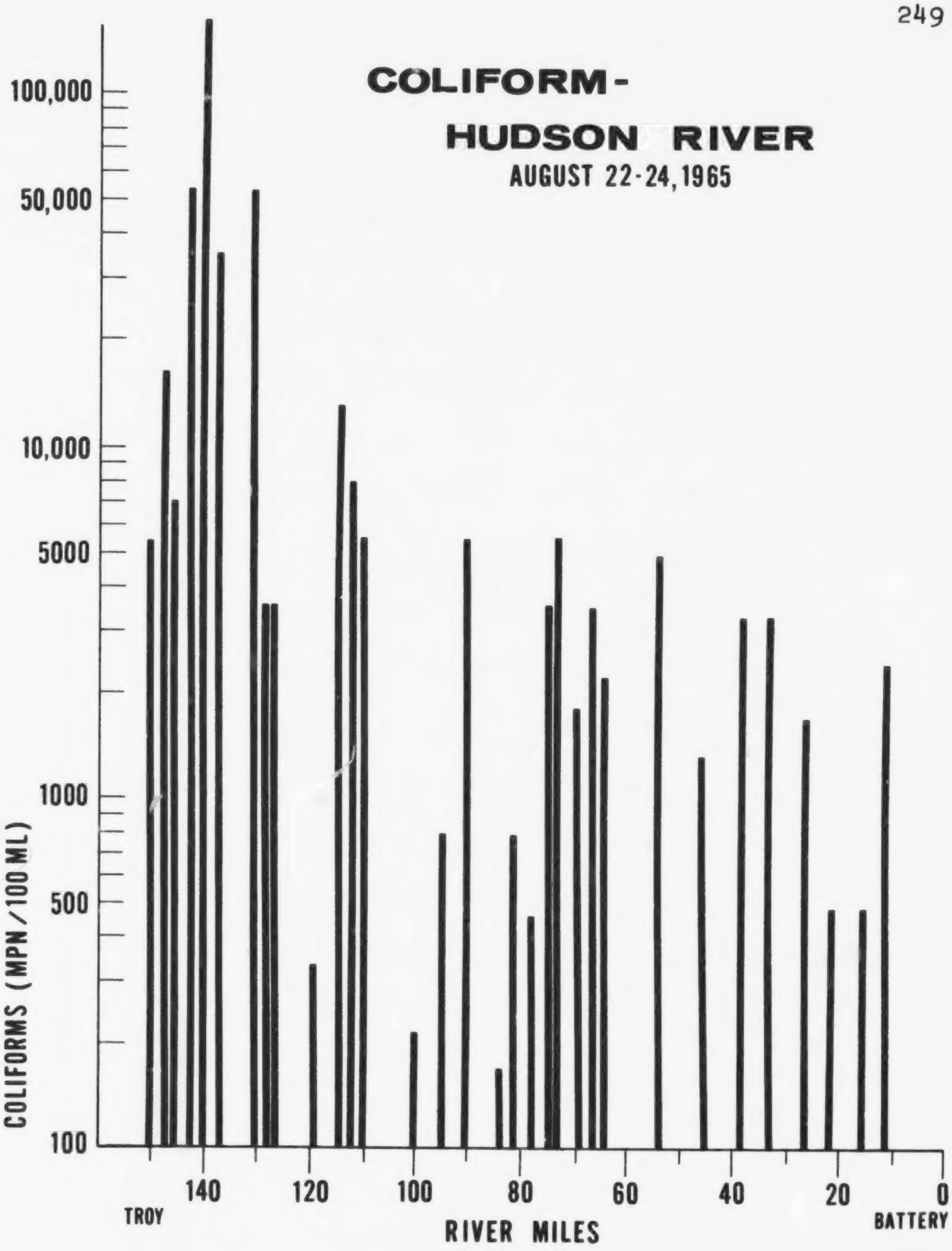
Dissolved oxygen values in the Kill Van Kull have often been observed at values of less than 2 mg/1 and in the main channel of Newark Bay at less than 2.5 mg/1. Newark Bay is, in effect, a vast holding pond with little net movement of the wastes discharged to it. These wastes exercise their biochemical oxygen demand in the immediate area of the discharge to such an extent as to make the conditions of these waters offensive. In instances when the Passaic Valley sewage treatment plant was discharging to Newark Bay, values of dissolved oxygen approaching septicity were experienced throughout Newark Bay and the Kill Van Kull.

Coliforms

On the basis of criteria of coliform density, a pattern of high coliform counts, reflecting discharges of raw and inadequately treated municipal wastes were found in the August 1965 survey as shown in Figure 5. Peak values in excess of 50,000/100 ml were found in the immediate area of Albany-Troy-Rensselaer, with levels in excess of 1,000/100 ml extending as far south as Catskill, a distance of over 40 miles. Coliform densities at the Rensselaer water intake exceeded 15,000/100 ml. Bacterial pollution discharged to the Hudson in the area causes a health hazard to persons who come in contact with the water for recreational or other purposes within the 40-mile area.

From Catskill to Tarrytown, values of from 3,000 to 5,000/100 ml were recorded, exceeding the recommended 1,000/100 ml maximum for recreational waters. From Tarrytown to the New York City line, coliform densities increased in value to greater than 5,000/100 ml.

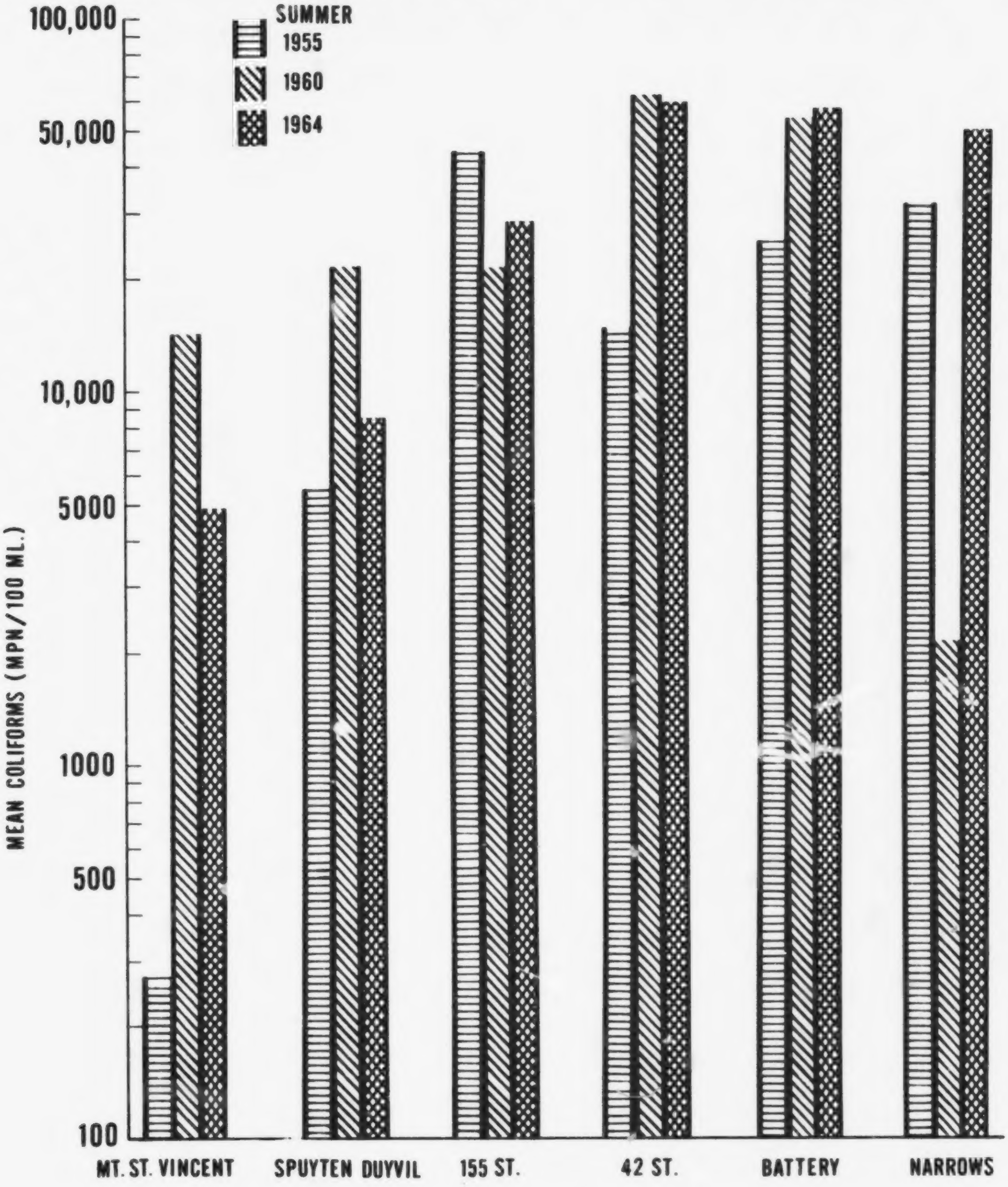
Data from the New York City Department of Public Works show that mean coliform densities for the past ten summers have been in excess of 10,000/100 ml throughout the Hudson from the George Washington Bridge to the Narrows (Figure 6). Mean values of 22,000/100 ml, upstream at Spuyten Duyvil in 1960, and 14,000/100 ml at Mount St. Vincent, were also recorded. In the Robbins Reef area of New York Bay, values of 33,000/100 ml have been recorded. The average coliform density in the lower Hudson, between the Battery and the George Washington Bridge, ranges between 6,000 and 40,000/100 ml, depending upon the tidal phase. Coliform densities are higher in the bottom waters than the surface waters and at all times coliform densities exceeded 5,000/100 ml.



COLIFORM-HUDSON RIVER

AUGUST 22-24, 1965

FIGURE 5



COLIFORM-NEW YORK HARBOR

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FIGURE 6

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The East River again showed the effect of severe pollution, with concentration reportedly greater than 110,000/100 ml being reached. At Newtown Creek, samples have been isolated of coliform counts of greater than 2,000,000/100 ml. Coliform data gathered in the Rikers Island area indicate an average density of 30,000 to 50,000/100 ml and, as one moves further east, means of 4,000 to 10,000/100 ml have been recorded at Throgs Neck. Flood waters from the lower East River bring pollution from that area to the upper East River and also effluents from Ward's Island, Bowery Bay and Hunts Point, which receive no chlorination, reach the site of proposed beaches at Ferry Point Park and Little Bay. The coliform density in this area exceeds values of 1,000/100 ml at the present time. This area cannot be used for bathing because of sewage contamination from both treated and untreated wastes. During wet weather, overflow from the combined sewers systems increase the coliform densities by three to four times their dry-weather value.

In the Harlem River, coliform densities range from 22,000 to 60,000/100 ml at the East River to 10,000 to 35,000/100 ml at its juncture with the Hudson River. Coliform densities in the Harlem River become progressively higher at those stages of current where the highly polluted waters from the East River flow up and through the Harlem into the Hudson River.

In the Kill Van Kull and in the mouth of Newark Bay, coliform densities have been observed to exceed 20,000/100 ml regularly.

Biology

Biological study of the Hudson during August 1965 confirms the pollutional patterns discussed in the preceding paragraphs. Pollution-tolerant organisms were found in extensive sections of the river from the Federal Dam at Troy downstream to Newburgh. Even these forms were not present in the vicinity of Albany and for a distance of 20 miles downstream. Oil coated the bottom and floated on the surface. Decomposing sludge deposits on the bottom caused gas bubbles to break the surface, imparting obnoxious odors. Silts from industrial plants -- rock-crushing -- were found to blanket the bottom in several areas, eliminating bottom life.

In the New York Harbor area, extensive sludge blankets exist in the East River and in Newark Bay. Rising sludge is visible in the shallower areas.

Pollution Trends

The Public Health Service has also maintained cooperatively at Poughkeepsie a Water Pollution Surveillance System Station over the past seven years. The records of this station were reviewed to determine longer-term trends. The report on this station appears in Appendix D. In summary, the report indicates significant pollution on the basis of coliform levels recorded.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. Since the time of Henry Hudson, the Hudson River has served as a major resource for the population centers along its shores, providing water supply, an abundant fishery, waterborne commerce, a place for recreation and the simple amenity of being by the river-side. The survival of New York City, the surrounding metropolitan areas, and the urban areas upstream, depends upon the restoration and the preservation of these most vital water uses. The area covered in this report is the Hudson River and its tributaries from the Federal Dam at Troy to the Narrows in New York City. The Hudson River in this area is presently used for recreational and non-recreational purposes. Numerous yacht clubs, marinas and parks depend upon the Hudson River for their existence.

It also provides water supply for 82,000 persons of Rensselaer, Poughkeepsie, Highland and Port Ewen. In the near future, it will also serve as an emergency source of water supply for New York City. It is a potential water supply for the 12,000,000 people of the burgeoning metropolitan areas of both New York and New Jersey.

2. The entire Hudson River, from the Albany-Troy-Rensselaer area to the Narrows, can be categorically described as polluted. The pollution from the equivalent of more than 10,000,000 persons is discharged to the river in this area. Forty-three percent of this is discharged without any treatment, or the equivalent of the waste of 4,217,000 people. Thirty-eight percent receives primary treatment. Two-thirds of the wastes discharged originate in the State of New York, and the remainder in the State of New Jersey. More than 50 industries discharge their waste to the stream. In addition, 22 Federal installations contribute waste, the equivalent of 82,000 persons to the river.

3. For recreational waters, it is recommended that the dissolved oxygen content be at least 5 mg/l and the coliform content not exceed 1,000 coliforms per 100 ml. During a survey in August of 1965, depressed dissolved oxygen conditions were found to exist throughout the area.

Levels below 5 mg/1 were found in the upper 60 miles of the stream. Values approaching zero existed immediately below the Albany-Troy-Rensselaer area. From Saugerties to Tarrytown, values recorded averaged about 5 mg/1. Tarrytown to the Narrows showed a steady decline, with a level of 3 at the George Washington Bridge. Lower levels occurred in the immediate harbor area and in the tributary areas of the East and Harlem Rivers and the Newark Bay and Kill Van Kull. In these tributary areas, levels of less than 3 mg/1 were frequently observed.

4. High densities of coliforms were observed in the Upper Hudson exceeding 5,000 per 100 ml and reaching a peak of 50,000 below Troy. Levels in excess of 1,000 are common throughout the area from Hudson to the New York City line. Levels in the New York Harbor area exceed 5,000 and in many cases reach 20,000 or more per 100 ml. In the tributary area of the harbor, counts exceeding 20,000 are common.

5. The discharges of untreated and inadequately treated wastes interfere with the use of this stream for water supply, recreation and fish and wildlife. The levels of dissolved oxygen and coliform density observed were such as to render the use of the river hazardous for recreation or water supply.

6. For the river to serve the vast population

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and industry that depend upon it, and so that it may be used for the maximum water uses possible, it will be necessary to provide and maintain facilities to accomplish exceptionally high levels of waste reduction combined with effective disinfection. Such facilities must at least be the equivalent of the most efficiently built and operated secondary sewage treatment plant. Even higher levels of waste treatment may be required in certain cases. It must be recognized that periodic wet and dry periods will occur and remedial facilities must be designed to provide protection for such occurrences. All sources of combined storm water and sewage should be intercepted and provided with treatment. It is proposed that the following time-table be put into effect:

1) Designs for remedial facilities will be completed by January 1, 1967;

2) Financing arrangements to be completed by April 1, 1967;

3) Construction started by July 1, 1967;

4) Construction completed and plants placed into operation by January 1, 1970;

5) Commensurate schedules should be adopted for the interception and treatment of industrial wastes and wastes from Federal

installations;

6) Existing schedules calling for earlier completion dates are to be met; and

7) The problem of storm water overflows should be reviewed and a program for action be prepared for consideration by December 31, 1968.

7. Pollution originating in the State of New York is endangering the health or welfare of persons living in the State of New Jersey; and pollution originating in the State of New Jersey is endangering the health or welfare of persons living in the State of New York, and, therefore, is subject to abatement under the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et seq).

Thank you.

MR. STEIN: Thank you, Mr. De Falco.

You skipped certain portions of the report. I assume you want your whole report in, with the tables and appendix?

MR. DE FALCO: Yes, I ask that the entire report be placed in the record.

MR. STEIN: That will be done, without objection. The entire report will be in.

APPENDIX A

NEW YORK STATE CLASSES AND QUALITY STANDARDS APPLICABLE TO DESIGNATED WATERS

* * * *

CLASSIFICATION AND STANDARDS OF QUALITY AND PURITY

Adopted by New York Water Pollution Control Board

PURSUANT TO ARTICLE 6*, PUBLIC HEALTH LAW

ADOPTING ORDER

Pursuant to the authority contained in Article 6* of the Public Health Law, the Board having held public hearings as therein provided, hereby adopts the following classifications and standards of quality and purity for the waters of New York State:

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* Now Article 12

I. GENERAL CLASSIFICATION STANDARDS SYSTEM

1. Definitions

The several terms, words or phrases hereinafter mentioned shall be construed as follows:

a. "Best usage" of waters as specified each class shall be those uses as determined by the Board in accordance with the considerations prescribed by Section 109** of the Public Health Law.

b. "Approved treatment" as applying to water supplies means treatment accepted as satisfactory by the authorities responsible for exercising supervision over the sanitary quality of water supplies.

c. "Source of water supply for drinking, culinary or food processing purposes" shall mean any source, either public or private, the waters from which are

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** Now Section 1209

used for domestic consumption or used in connection with the processing of milk, beverages, foods or for other purposes which require finished water meeting U. S. Public Health Service Drinking Water Standards.

d. "Fishing" shall include the propagation of fish and other aquatic life.

e. "Agricultural" shall include use of waters for stock watering, irrigation and other farm purposes but not as source of water supply for drinking, culinary or food processing purposes.

f. "Tidal salt waters" shall mean all tidal waters which are so designated by the Board and which generally shall have a chloride ion content in excess of 250 parts per million.

2. Conditions Applying to All
Classifications and Standards

a. In any case where the waters into which sewage, industrial wastes or other wastes effluents discharge are assigned a different classification than the waters into which such receiving waters flow, the standards applicable to the waters which receive such sewage or wastes effluents shall b supplemented by the following:

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> "The quality of any waters receiving sewage, industrial wastes or other wastes discharges shall be such that no impairment of the best usage of waters in any other class shall occur by reason of such sewage, industrial wastes or other wastes discharges."

b. Natural waters may on occasion have characteristics outside of the limits established by the standards. The standards adopted herein relate to the condition of waters as affected by the discharge of sewage, industrial wastes or other wastes.

3. CLASSES AND STANDARDS OF FRESH SURFACE WATERS

CLASS AA

Best usage of waters: Source of water supply for drinking, culinary or food processing purposes and any other usages.

Conditions related to best usage: The waters, if subjected to approved disinfection treatment, with additional treatment if necessary to remove naturally present impurities, meet or will meet U. S. Public Health Service Drinking Water Standards and are or will be considered safe and satisfactory for drinking water purposes.

QUALITY STANDARDS FOR CLASS AA WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; oil; sludge deposits; tastes or odor producing substances.	None attributable to sewage, industrial wastes or other wastes.
2. Sewage or wastes effluents.	None which are not effectively disinfected.
3. pH.	Range between 6.5 and 8.5.
4. Dissolved oxygen.	For trout waters, not less than 5.0 parts per million; for non-trout waters, not less than 4.0 parts per million.
5. Toxic wastes, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to be injurious to fish life, make the waters unsafe or

unsuitable as a source of water supply for drinking, culinary or food processing purposes or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

NOTE NO. 1: In determining the safety or suitability of waters in this class for use as a source of water supply for drinking, culinary or food processing purposes after approved treatment, the Water Pollution Control Board will be guided by the standards specified in the latest edition of "Public Health Service Drinking Water Standards" published by the United States Public Health Service.

NOTE NO. 2: With reference to certain toxic substances as affecting fish life, the establishment of any single numerical standard for waters of New York State would be too restrictive. There are many waters, which because of poor

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buffering capacity and composition, will require special study to determine safe concentrations of toxic substances.

However, based on non-trout waters of approximately median alkalinity (80 p.p.m.) or above for the State, in which groups most of the waters near industrial areas in this State will fall, and without considering increased or decreased toxicity from possible combinations, the following may be considered as safe stream concentrations for certain substances to comply with the above standard for this type of water. Waters of lower alkalinity must be specially considered since the toxic effect of most pollutants will be greatly increased.

Ammonia or Ammonium compounds	Not greater than 2.0 parts per million (NH_3) at pH of 8.0 or above.
Cyanide	Not greater than 0.1 parts per million (CN)
Ferro-or Ferricyanide	Not greater than 0.4 parts per million ($Fe(CN)_6$)

Copper	Not greater than 0.2 parts per million (Cu)
Zinc	Not greater than 0.3 parts per million (Zn)
Dadmium	Not greater than 0.3 parts per million (Cd)

CLASS A

Best usage of waters: Source of water supply for drinking, culinary or food processing purposes and any other usages.

Conditions related to best usage; The waters, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet U. S. Public Health Service Drinking Water Standards and are or will be considered safe and satisfactory for drinking water purposes.

QUALITY STANDARDS FOR CLASS A WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids, sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or

	other wastes or which deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. Sewage or waste effluents.	None which are not effectively disinfected.
3. Odor producing substances contained in sewage, industrial wastes or other wastes.	The waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto shall not have an increased threshold odor number greater than 8, due to such added wastes.
4. Phenolic compounds.	Not greater than 5 parts per billion (Phenol).
5. pH.	Range between 6.5 and 8.5.
6. Dissolved Oxygen.	For trout waters, not less than 5.0 parts per million; for non-trout waters, not less than 4.0 parts per million.

7.	Toxic wastes, oil, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to be injurious to fish life, make the waters unsafe or unsuitable as a source of water supply for drinking, culinary or food processing purposes or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

NOTE: Refer to Notes 1 and 2 under Class AA, which are also applicable to Class A standards.

CLASS B

Best usage of waters: Bathing and any other usages except as source of water supply for drinking, culinary or food processing purposes.

QUALITY STANDARDS FOR CLASS B WATERS

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ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. Sewage or wastes effluents.	None which are not effectively disinfected.
3. pH.	Range between 6.5 and 8.5.
4. Dissolved oxygen.	For trout waters, not less than 5.0 parts per million; for non-trout waters, not less than 4.0 parts per million.
5. Toxic wastes, oil, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as

	to be injurious to fish life, make the waters unsafe or unsuitable for bathing or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

NOTE: Refer to Note No. 2 under Class AA, which is also applicable to Class B standards.

CLASS C

Best usage of waters: Fishing and any other usages except for bathing or as source of water supply for drinking, culinary or food processing purposes.

QUALITY STANDARDS FOR CLASS C WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which

	deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. pH.	Range between 6.5 and 8.5.
3. Dissolved oxygen.	For trout waters, not less than 5.0 parts per million; for non-trout waters, not less than 4.0 parts per million.
4. Toxic wastes, oil, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to be injurious to fish life or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

NOTE: Refer to Note No. 2 under Class AA, which is also applicable to Class C standards.

CLASS D

Best usage of waters: Agricultural or source of industrial cooling or process water supply and any other usage except for fishing, bathing or as source of water supply for drinking, culinary or food processing purposes.

Conditions related to best usage: The waters will be suitable for fish survival; the waters without treatment and except for natural impurities which may be present will be satisfactory for agricultural usages or for industrial process cooling water; and with special treatment as may be needed under each particular circumstance, will be satisfactory for other industrial processes.

QUALITY STANDARDS FOR CLASS D WATERS

ITEMS	SPECIFICATIONS
1. Floating solids, settleable solids; sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which deleteriously increase the amounts of these constituents

	in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. pH.	Range between 6.0 and 9.5.
3. Dissolved Oxygen.	Not less than 3.0 parts per million.
4. Toxic wastes, oil, deleterious substances, colored or other wastes, or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to prevent fish survival or impair the waters for agricultural purposes or any other best usage as determined for the specific waters which are assigned to this class.

NOTE: Refer to Note No. 2 under Class AA, which is also applicable to Class D standards.

CLASS E

Best usage of waters: Sewage or industrial wastes or other wastes disposal and transportation or any other usages except agricultural, source of industrial cooling or process water supply, fishing, bathing, or source of water supply for drinking, culinary or food processing purposes.

QUALITY STANDARDS FOR CLASS E WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; oil, sludge deposits.	None attributable to sewage, industrial wastes or other wastes in sufficient amounts to interfere with navigation or cause a public nuisance as defined by the Penal Law.
2. pH.	Not lower than 5.0.
3. Dissolved Oxygen.	Sufficient dissolved oxygen to prevent odor nuisances due to anaerobic decomposition unless other effective means are used to control odors.
4. Odor producing substances.	None in sufficient amounts to cause a public nuisance as defined by the Penal Law.

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CLASS F

Best usage of waters: Sewage or industrial wastes or other wastes disposal.

QUALITY STANDARDS FOR CLASS F WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; oil, sludge deposits.	None attributable to sewage, industrial wastes or other wastes in sufficient amounts to cause a public nuisance as defined by the Penal Law.
2. Dissolved Oxygen.	Sufficient dissolved oxygen to prevent odor nuisances due to anaerobic decomposition unless other effective means are used to control odors.
3. Odor producing substances.	None in sufficient amounts to cause a public nuisance as defined by the Penal Law.

4. CLASSES AND STANDARDS FOR TIDAL SALT WATERS

CLASS SA

Best usage of waters: Shellfishing for market purposes and any other usages.

QUALITY STANDARDS FOR CLASS SA WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; oil; sludge deposits.	None attributable to sewage, industrial wastes or other wastes.
2. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the Marine District as defined by State Conservation Law.
3. Sewage or waste effluents.	None which are not effectively disinfected.
4. Dissolved Oxygen.	Not less than 5.0 parts per million.
5. Toxic wastes, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as

	to be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
6. Organisms of Coliform group.	The median MPN value in any series of samples representative of waters in the shellfish growing area shall not be in excess of 70 per 100 milliliters.

CLASS B

Best usage of waters: Bathing and any other usages except shellfishing for market purposes.

QUALITY STANDARDS FOR CLASS SB WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; oil; sludge deposits.	None attributable to sewage, industrial wastes or other wastes.
2. Garbage, cinders, ashes, oils, sludge, or other refuse.	None in any waters of the Marine District as defined by State Conservation Law.
3. Sewage or waste effluents.	None which are not effectively disinfected.
4. Dissolved oxygen.	Not less than 5.0 parts per million.
5. Toxic wastes, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof; and otherwise none in sufficient amounts to make the waters unsafe or unsuitable

	for bathing or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS SC

Best usage of waters: Fishing and any other usages except bathing or shellfishing for market purposes.

QUALITY STANDARDS FOR CLASS SC WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with

		the wastes discharged thereto.
2.	Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the Marine District as defined by State Conservation Law.
3.	Dissolved oxygen.	Not less than 5.0 parts per million.
4.	Toxic wastes, oil, deleterious substances, colored or other wastes or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts or at such temperatures as to be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS SD

Best usage of waters: Any usages except fishing, bathing, or shellfishing for market purposes.

QUALITY STANDARDS FOR CLASS SD WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the Marine District as defined by State Conservation Law.
3. Dissolved oxygen.	Not less than 3.0 parts per million.
4. Toxic wastes, oil, deleterious substances, colored or other wastes.	None alone or in combination with other substances or wastes in sufficient amounts

to prevent survival of fish life or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS I

Best usage of waters: Fishing and any other usages except bathing or shellfishing for market purposes.

QUALITY STANDARDS FOR CLASS I WATERS

ITEMS	SPECIFICATIONS
1. Floating solids; settleable solids; sludge deposits.	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes

		discharged thereto.
2.	Garbage, cinders, ashes, oils, sludge, or other refuse.	None in any waters of the Marine District as defined by State Conservation Law.
3.	Sewage or waste effluents.	Effective disinfection if required by Interstate Sanitation Commission.
4.	Dissolved oxygen.	An average of not less than 50 percent saturation during any week of the year, but not less than 3.0 parts per million at any time.
5.	Toxic wastes, oil, deleterious substances, colored or other wastes, or heated liquids.	None alone or in combination with other substances or wastes in sufficient amounts to be injurious to edible fish and shellfish, or the culture or propagation thereof, or which shall in any manner affect the flavor, color, odor, or sanitary condition of such fish or shellfish so as to injuriously affect the sale thereof, or which shall

cause any injury to the public and private shellfisheries of this State; and otherwise none in sufficient amounts to impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS II

Best usage of waters: All waters not primarily for recreational purposes, shellfish culture or the development of fish life.

QUALITY STANDARDS FOR CLASS II WATERS

ITEMS:	SPECIFICATIONS:
1. Floating solids; settleable solids; sludge deposits.	None which are readily visible and attributable to sewage or other wastes or which deleteriously increase the amounts of these

	constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. Garbage, cinders, ashes, oils, sludge, or other refuse.	None in any waters of the Marine District as defined by State Conservation Law.
3. Dissolved oxygen.	An average of not less than 30 percent saturation during any week of the year, provided such saturation levels insure adequate oxygen to support fish and shellfish life at all times.
4. Toxic wastes, oil, deleterious substances, colored or other wastes.	None alone or in combination with other substances or wastes in sufficient amounts to be injurious to edible fish and shellfish, or the culture or propagation thereof, or which shall in any manner affect the flavor, color,

odor, or sanitary condition of such fish or shellfish so as to injuriously affect the sale thereof, or which shall cause any injury to the public and private shellfisheries of this State.

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APPENDIX B

INTERSTATE SANITATION COMMISSION

CLASSES AND QUALITY STANDARDS APPLICABLE TO DESIGNATED WATERS

Article VI and Article VII of Article 12-B of the Public Health Law: Tri-State Compact and Interstate Sanitation Commission.

ARTICLE VI

1. It is recognized by the signatory States that, where tidal waters are used for such varied purposes as bathing, navigation, shellfish culture, the development of fish life, and the disposal of wastes, no single standard of purity is practicable in all parts of the district. In order to attain the objects of this compact, the Commission, after proper study and after conducting public hearings upon due notice, shall group the designated water of the district into classes. Where local conditions shall have changed in the future to such an extent that changes in classification become necessary the Commission may, after conducting public hearings upon due notice, adopt such changes.

Two general classifications shall be used:

(1) Class "A," in which the designated water areas are expected to be used primarily for recreational purposes, shellfish culture or the development of fish life;

(2) Class "B," in which the designated water areas are not expected to be used primarily for recreational purposes, shellfish culture or the development of fish life.

ARTICLE VII

1. It is agreed between the signatory States that no sewage or other polluting matters shall be discharged or permitted to flow into, or be placed in, or permitted to fall or move into the tidal waters of the district, except under the following conditions and restrictions:

(1) All sewage discharged or permitted to flow into Class "A" waters of the district shall first have been so treated as

(a) to remove all floating solids and at least sixty percentum (60%) of the suspended solids; and

(b) to effect a reduction of organisms of the B. Coli group (intestinal bacilli) so that the probable number of such organisms shall not exceed one per cubic centimeter in more than fifty percentum (50%) of the samples of sewage effluent tested by the partially confirmed test; provided, however, that in the case of discharge into waters used primarily for bathing this bacterial standard need not be required except during the bathing season; and

(c) to effect a reduction in the oxygen demand of the sewage effluent sufficient to maintain an average dissolved oxygen content in the tidal waters of the district and in the general vicinity of the point of discharge of the sewage into those waters, at a depth of about five feet below the surface, of not less than fifty percentum (50%) saturation during any week of the year.

2. All sewage discharged or permitted to flow into Class "B" waters of the district shall first have been so treated as

(a) to remove all floating solids and at least ten percentum (10%) of the suspended solids, or such additional percentage as may by reason of local conditions be necessary to avoid the formation of sludge deposits in the class "B" waters of the district; and

(b) to effect a reduction in the oxygen demand of the sewage effluent sufficient to maintain an average dissolved oxygen content in the tidal waters of the district and in the general vicinity of the point of discharge of the sewage into those waters, at a depth of about five feet below the surface, of not less than thirty percentum (30%) saturation during any week of the year.

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APPENDIX C

STATUS OF DISCHARGES IN NEW YORK STATE AREA OF THE HUDSON RIVER AS REPORTED BY NEW YORK STATE HEALTH DEPARTMENT

AUGUST 1965

HUDSON RIVER DRAINAGE BASIN

DISCHARGES REQUIRING CORRECTIVE ACTION

ALBANY COUNTY

	Communities and Institutions		
Name	Population	Location	Characteristics of Discharges
Cohoes (C)	20,129	Cohoes	Raw sewage
Watervliet (C)	14,000	Watervliet	Untreated sewage
Albany (C)	126,000	Albany	Untreated and inadequately treated sewage
Green Island (V)	3,533	Green Island	Raw sewage
Menands (V)	2,314	Menands	Raw sewage
Watervliet Arsenal		Watervliet	Plating wastes & oils
Ravena	2,424	Ravena	Inadequate treatment needs secondary

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Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Altamont (V)	1,365	Altamont	Needs secondary treatment
Bethlehem (T) (Delmar, Elsmer S.D.)	10,000	Bethlehem	Needs secondary treatment
Colonie (T) (Latham & Maplewood)	9,500	Colonie	Needs additional treatment
McKownville (H)	500	McKownville	Raw discharges
Coeymans (H)	854	Coeymans	Raw discharges
West Albany S. D.	550	West Albany	Raw sewage
Selkirk (H)	100	Selkirk	Raw discharges
Albany City Water Treatment Plant		Albany	Filter Backwash Solids
Guilderland State Health Farm		Guilderland	Needs additional treatment

Industries

Manning Paper	Green Island	Paper wastes (Fiber, Color, Organic, Solids)
Alleghany-Ludlum Corp.	Watervliet	Oil & discoloration
Delaware and Hudson	Watervliet	Oil

Industries

Tobin Packing Co.	Albany	Meat processing (Organic, Color, Solids)
Mohawk Paper Co.	Cohoes	Solids, fiber, discoloration
Carr Packing Co.	Cohoes	Blood and washings
Behr-Manning	Watervliet	Acids and organics

RENSSELAER COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Troy (C)	67,492	Troy	Raw sewage
Pleasantdale (H)	840	Pleasantdale	Raw sewage discharges
Hemstreet Park (H)	480	Hemstreet Park	Raw sewage discharges
Averill Park (H)	711	Averill Park	Raw sewage discharges
Rensselaer (C)	10,506	Rensselaer	Raw sewage
Castleton	1,752	Castleton	Raw sewage
East Greenbush (T)	5,200	East Greenbush	Needs secondary treatment
SD #1			
Hoosick Falls (V)	4,023	Hoosick Falls	Raw sewage
Valley Falls (V)	589	Valley Falls	Raw sewage

Industries

Thompson Mills	Valley Falls	Sanitary, Organic, and Color
F. C. Huyck & Sons	Rensselaer	Felt and Fabrics (Fibers, Colors, and solids)
Fort Orange Paper Co.	Castletown	Paper Wastes (Fibers, Colors, Organic, Solids, Chemicals)
Loeffel Waste Oil Co.	Nassau	Oil sludge
Ludlow Valve Co.	Troy	Metal Processing (Acids, Alkalies, Solids)
Winthrop-Stearns Corp.	Rensselaer	Drug Manufacturing Chemicals, Colors, Solids)
General Aniline and Film Corp.	Rensselaer	Dye Wastes (Solids, Color, Chemicals)
Columbia Box Board Mill	Hoosick (T)	Paper Wastes (Fibers, Colors, Organic, Solids)
Wood Flong Corp.	Hoosick Falls (V)	Paper Wastes (Fibers, Colors, Organic, Solids, Chemicals)

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GREENE COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
West Coxsackie (H)	500	West Coxsackie	Raw discharges
New Baltimore (H)	400	New Baltimore	Raw discharges
Cairo (H)	500	Cairo	Raw discharges
Clementon (H)	700	Clementon	Raw discharges
Leeds (H)	200	Leeds	Raw discharges
Coxsackie (V)	2,849	Coxsackie	Raw sewage
Catskill (V)	5,825	Catskill	Raw sewage
Athens (V)	1,754	Athens	Raw sewage

COLUMBIA COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Greenport (T) SD#1	1,800	Greenport	Needs secondary treatment
E. Chatham (H)	200	E. Chatham	Raw discharges
Germantown (H)	400	Germantown	Raw discharges
Valatie (V)	1,237	Valatie	Raw discharges
Philmont (V)	1,750	Philmont	Raw discharges
Hudson Training School	450	Hudson	Needs secondary treatment
Hudson Training School (Farm Colony)	110	Valatie	Needs secondary treatment
Hudson (C)	11,075	Hudson	Raw discharge

Industries

Columbia Corp.	Chatham	(Color, Solids, Organic) Paper wastes
Kimberly Clark Corp.	Ancram	Tobacco slurry (Color, Solids, Organic)
Schweitzer Div. Prince-High Rock Mills	Philmont	BOD and discoloration
Clermont Fruit Packers	Clermont	Solids and discoloration
Northeast Fruit Growers Cooperative	Livingston	Solids and odors

ULSTER COUNTY

Communities and Institutions

Name	Location	Characteristics of Discharges
Chichester H.	Shadaken (T)	Need secondary treatment
Whittier Sewer District	Ulster (T)	Need secondary treatment
Wallkill Sewer District	Shawangunk (T)	Need secondary treatment
New Paltz Village	New Paltz (V)	Need secondary treatment
Saugerties Village EBP	Saugerties (V)	Need secondary treatment
Saugerties Village DUP	Saugerties (V)	Need secondary treatment
Saugerties Village PP	Saugerties (V)	Need secondary treatment
Kingston City	Kingston (C)	Need secondary treatment
Rosendale Village	Rosendale (V)	Raw discharges
Marist Prep. School	Esopus (T)	Need secondary treatment
Kerhonkson H.	Warwarsing (T)	Raw discharges

Industries

Rondout Paper Mills	Warwarsing (T)	Color, Solids, Turbidity
Martin Cantine Coated Paper Co.	Saugerties (V)	Color from dye and finishing wastes
Ulster County Tissue Mill	Saugerties (V)	Color from dye and finishing wastes
Dall Vechia & Son	Highland	Solids from food processing
Hudson Valley Apple Prod.	Milton	Solids and spent caustic solutions
Hudson Valley Wine Co.	Marlboro	Volatiles from evaporators

DUTCHESS COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
State Hospital	6,000	Poughkeepsie	Need secondary treatment
Matteawan State Hospital	3,000	Beacon	Need secondary treatment
Milbrook Village	1,260	Milbrook	Need secondary treatment
Tivoli Village	750	Tivoli	Need secondary treatment
Wappinger Falls	3,500	Wappinger Falls	Need secondary treatment
Arlington Sewer District	6,155	Poughkeepsie	Need secondary treatment
Beacon	17,500	Beacon	Need secondary treatment
Poughkeepsie City	38,330	Poughkeepsie	Need secondary treatment

Industries

Texaco Research Center	Fishkill	Discoloration from petroleum wastes
Orchard Mill Farms	Red Hook	Septic system overflows
DeLaval Separator	Poughkeepsie	No present probler
Western Lithography Co.	Poughkeepsie	Present sewage treatment needs updating

ORANGE COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Maybrook Village	1,348	Maybrook (V)	Need secondary treatment
Highland Falls-south	500	Highland Falls (V)	Need secondary treatment
Warwick Village	1,500	Warwick (V)	Need secondary treatment
New Windsor SD 12	6,250	New Windsor (T)	Need secondary treatment
Highland Falls-north	4,469	Highland Falls(V)	Need secondary treatment
Cornwall Village	2,000	Cornwall (V)	Need secondary treatment
Cornwall SD 1	2,500	Cornwall (T)	Need secondary treatment
Walden Village	4,851	Walden (V)	Need secondary treatment
Monroe Village		Monroe (V)	Need secondary treatment
Newburgh City	32,000	Newburgh (C)	
Slate Mill	75	Wawyanda (T)	Raw discharges

Florida Village	300	Florida (V)	Raw discharges
Amchir Sewer Co.		Wallkill (T)	
West Point Summer Camp	1,500	West Point	Need secondary treatment
Washingtonville	800	Washingtonville (V)	Raw discharges
U.S. Military Academy		West Point	Need secondary treatment

Industries

Ferndale Farms	Wallkill (T)	Milky discoloration
Mack Brothers	Goshen (T)	Waste treatment system failing
Monroe Laundry	Monroe (V)	Greyish discoloration
Park Tissue Mills	Salisbury Mills	Solids, turbidity, fibers
Majestic Weaving	Firthcliffe	Fabric process and dye wastes
Am. Felt Co.	New Windsor	Color from fabric processing and sewage
National Gypsum Co.	New Windsor	Discoloration and turbidity from processing

PUTNAM COUNTY

Communities and Institutions

Cold Spring Village	2,083	Cold Spring (V)	Raw discharge

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ROCKLAND COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Piermont Village	1,500	Piermont (V)	Pump station under construction. Existing primary plant to be abandoned.
Rockland State Hosp.		Orangetown (T)	Deficient secondary treatment
Tappan H.		Orangetown (T)	Raw discharges. Sewers under construction
Sparkill H.		Orangetown (T)	Raw discharges. Sewers under construction
Upper Nyack Village	732	Upper Nyack (V)	Need secondary treatment
South Nyack Village	3,200	South Nyack (V)	Need secondary treatment
Nyack Village	5,300	Nyack (V)	Need secondary treatment
Haverstraw Village	5,593	Haverstraw (V)	Need secondary treatment
Orangetown SD 2	2,350	Orangetown (T)	Need secondary treatment
Letuchworth Village	4,000	Haverstraw (T)	Need secondary treatment
N.Y.S. Rehabilitation Hospital	500	West Haverstraw(V)	Need secondary treatment
Sewage Treatment Plant	1,000	West Haverstraw(V)	Need secondary treatment
Iona Island	50	Stony Point (T)	Need secondary treatment

Name	Population	Location	Characteristics of Discharges
Palisades Inter-State Park	5,000	Stony Point (T)	Need secondary treatment
Jewish Home for Convalescents	80	Grandview (V)	Present septic tank inadequate.

Industries

Continental Can Co., Inc.	Piermont	White water and equipment washup
Kay-Pries Chemicals, Inc.	Stony Point	Dark gray discoloration
Elk Piece Dye Corks, Inc.	Garnerville	Dye wastes
United Wire Goods	Garnerville	Plating rinse waters
E & S Finishing Co.	Garnerville	Dye rinsing. Receiving stream blue discoloration
Piermont Finishing Co.	Garnerville	Dye rinsing. Receiving stream blue discoloration
Mead Textile Printers	Garnerville	Dye rinsing. Receiving stream blue discoloration
New York Trap Rock Corp.	Haverstraw	Orange discoloration and turbidity

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WESTCHESTER COUNTY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Sing Sing Prison	3,000	Ossining	Need secondary treatment
Peekskill City	18,000	Peekskill (C)	Need secondary treatment
Yonkers STW	440,241	Yonkers (C)	Need secondary treatment
Briarcliff Manor 2	5,000	Briarcliff (V)	Need secondary treatment
Ossining Village	2,000	Ossining (V)	Need secondary treatment
Croton-on-Hudson	3,929	Croton-on-Hudson(V)	Need secondary treatment
Irvington (V)	4,000	Irvington (V)	Need secondary treatment
Tarrytown Village	9,800	Tarrytown (V)	Need secondary treatment
No. Tarrytown Village	9,100	North Tarrytown (V)	Need secondary treatment
Ossining Village WAT	14,000	Ossining (V)	Need secondary treatment
Briarcliff Manor 1	125	Briarcliff (V)	Need secondary treatment
Franklin Roosevelt V.A. Hospital	3,000	Cortlandt (T)	Need secondary treatment
St. Joseph's Home	500	Peekskill (C)	Raw discharge
N.Y.S. Military and Naval Affairs	2,400	Cortlandt (T)	Need secondary treatment

Industries

Refined Syrup & Sugars, Inc.	Yonkers	Turbidity, color, sludge from sewage and wastes
Chevrolet Division of General Motors, Inc.	Tarrytown	Color & oil from metal washing and paint spraying
Hudson Wire Co.	Ossining	Plating and pickling wastes
Barlow Chemical Corp.	Ossining	Process wastes from production of synthetic chemicals
New York Central R.R. Co.	Harmon	Oil filter cleaning&shop wastes
Standard Coated Products	Buchanan	Turbidity color and sludge from sewage and wastes
Standard Brands, Inc.	Peekskill	Color from yeast fermentation and vinegar
Cortland Stone Co.	Peekskill	Turbidity from dust control
The Ednalite Optical Co.	Peekskill	Turbidity and oil from grinding processes

NEW YORK CITY

Communities and Institutions

Name	Population	Location	Characteristics of Discharges
Manhattan: Battery	700,000	Manhattan	Raw sewage
to			
Harlem River	50,000	Manhattan	Have screening - need secondary treatment

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APPENDIX D

POLLUTION TRENDS IN THE HUDSON RIVER AT A POINT BELOW POUGHKEEPSIE, N.Y.

WATER POLLUTION SURVEILLANCE STATION NO. 18

Introduction

The Public Health Service has, since July 1958, maintained a Water Pollution Surveillance System station in the Hudson River below Poughkeepsie. The International Business Machines Corporation has participated in the operation of this station. This report summarizes and evaluates water quality data collected to date.

Hydrology

The water pollution surveillance station below Poughkeepsie is located about 70 miles above the mouth of the Hudson River as shown on Figure 1.

The station is located within the tidal reach of the river. The river is affected by semidiurnal tides to Troy Lock and Dam, some 75 miles upstream from Poughkeepsie. Daily tidal ranges vary from 3 to 6-1/2 feet in New York Harbor and from 4-1/2 to 6-1/2 feet at Albany.

The Hudson River estuary has been characterized (1)* as partially mixed where the salinity and density increase with depth. The horizontal salinity distribution shows an increase from the head toward the mouth at any given depth.

Flows are gaged at Green Island, just upstream from Troy Lock and Dam. The tributary area at the gage is about 85% of that at the pollution surveillance station. Figure 2 compares historical and recent flows reported by the U. S. Geological Survey (2, 3, 4). Average annual flows for the 13-year base period were 13,225 cfs. The figure reveals the sustained periods of minimum flows during water years 1964 and 1965.

Water Quality

Figure 3 shows levels, variations, and trends in dissolved oxygen concentration and saturation values. Throughout water years 1960 through 1964, concentrations were generally between 6 and 12 mg/l, corresponding to saturation values of from about 60 to 85 percent. BOD's were low, ranging from about 0.6 to 3.4 mg/l. There was an increasing trend in COD which averaged 14 mg/l in WY-1960 and 22 mg/l in WY-1964. Geometric means of coliform bacteria concentrations approximately doubled between WY-1962 and WY-1964, with maximum values indicating a rather high pollution level.

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* Numbers in parentheses refer to References following Appendix D.

Figure 4 shows levels and variations in chloride, sulfate, alkalinity, and hardness. During water years 1963 and 1964, there has been a marked increase in chloride, moderate increases in hardness and alkalinity, and no significant change in sulfate concentrations. Some of the increases are probably related to the normal inverse relationship between concentrations of mineral constituents and flow. The relationships of these changes to the stream flow indicates the intrusion of salt water during low flow periods.

Figure 5 shows a comparison of recent chloride and sulfate concentrations with those of previous years. Chlorides began to rise in late September 1964 when average flows had been less than 4,000 cfs for about three months (see Figure 2). Chlorides remained high until early December when the flows increased. The short-term chloride variability during the September-December period was probably related to semidiurnal and fortnightly tides, although these data do not permit resolving the relative effects of the two tides.

Figure 1

Map of Hudson River, New York Harbor to Kingston

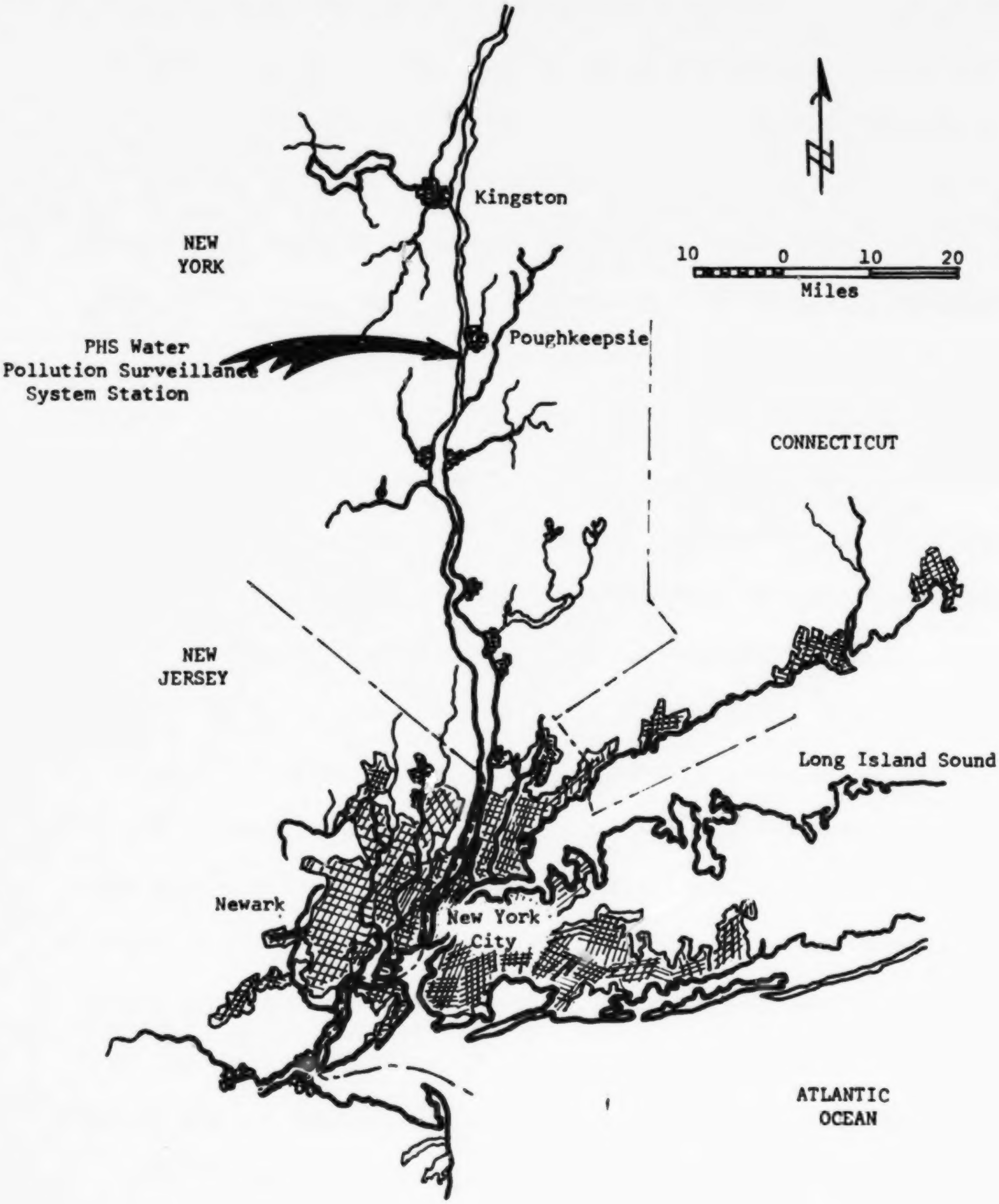

Kingston
NEW YORK
10 0 10 20
Miles
PHS Water Pollution Surveillance System Station
Poughkeepsie
CONNECTICUT
NEW JERSEY
Long Island Sound
Newark
New York City
ATLANTIC OCEAN

Figure 2

Streamflows, Hudson River at Green Island,
Comparison of Water Years 1964 and 1965
with Prior 13 Year Record

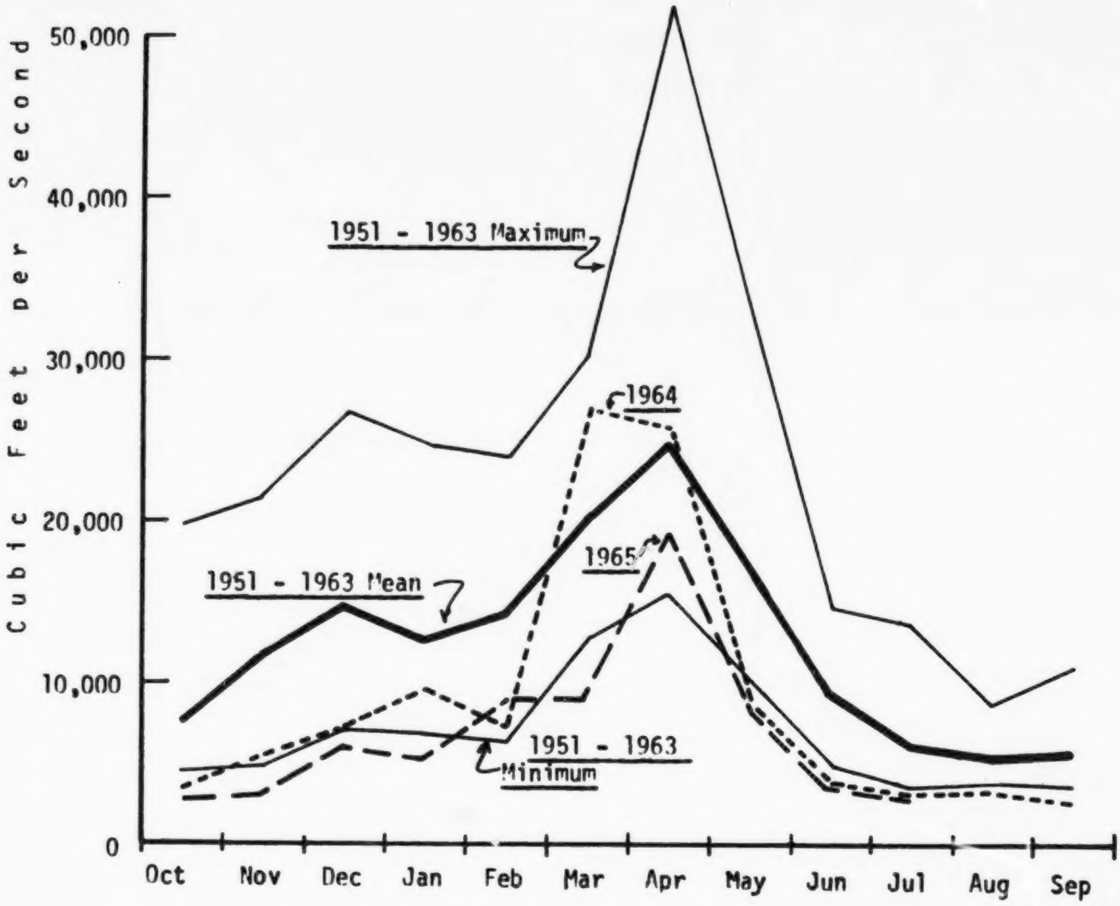


Figure 3
Dissolved Oxygen, Oxygen Demands, and Coliform Bacteria

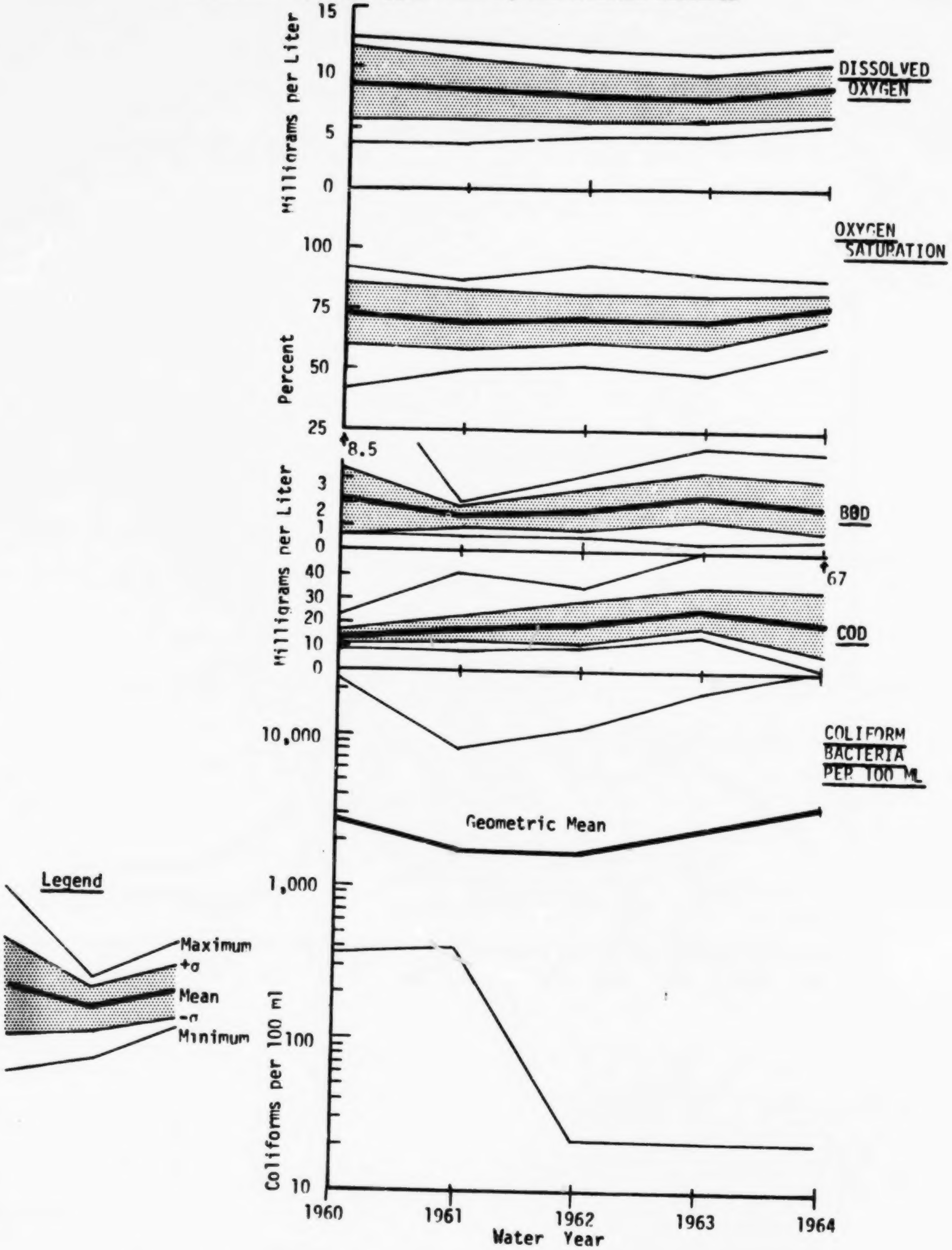
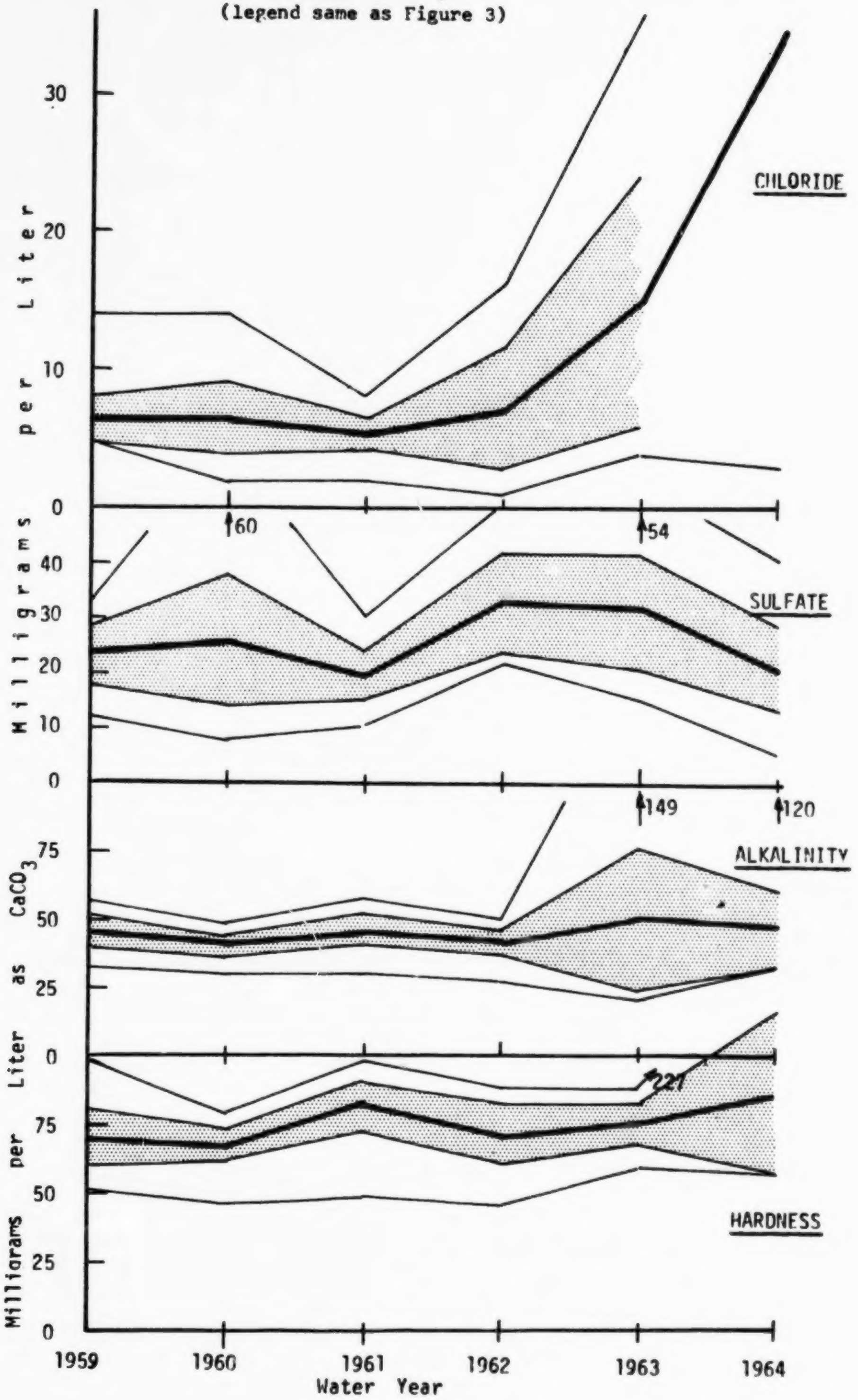


Figure 4

Mineral Quality

(legend same as Figure 3)



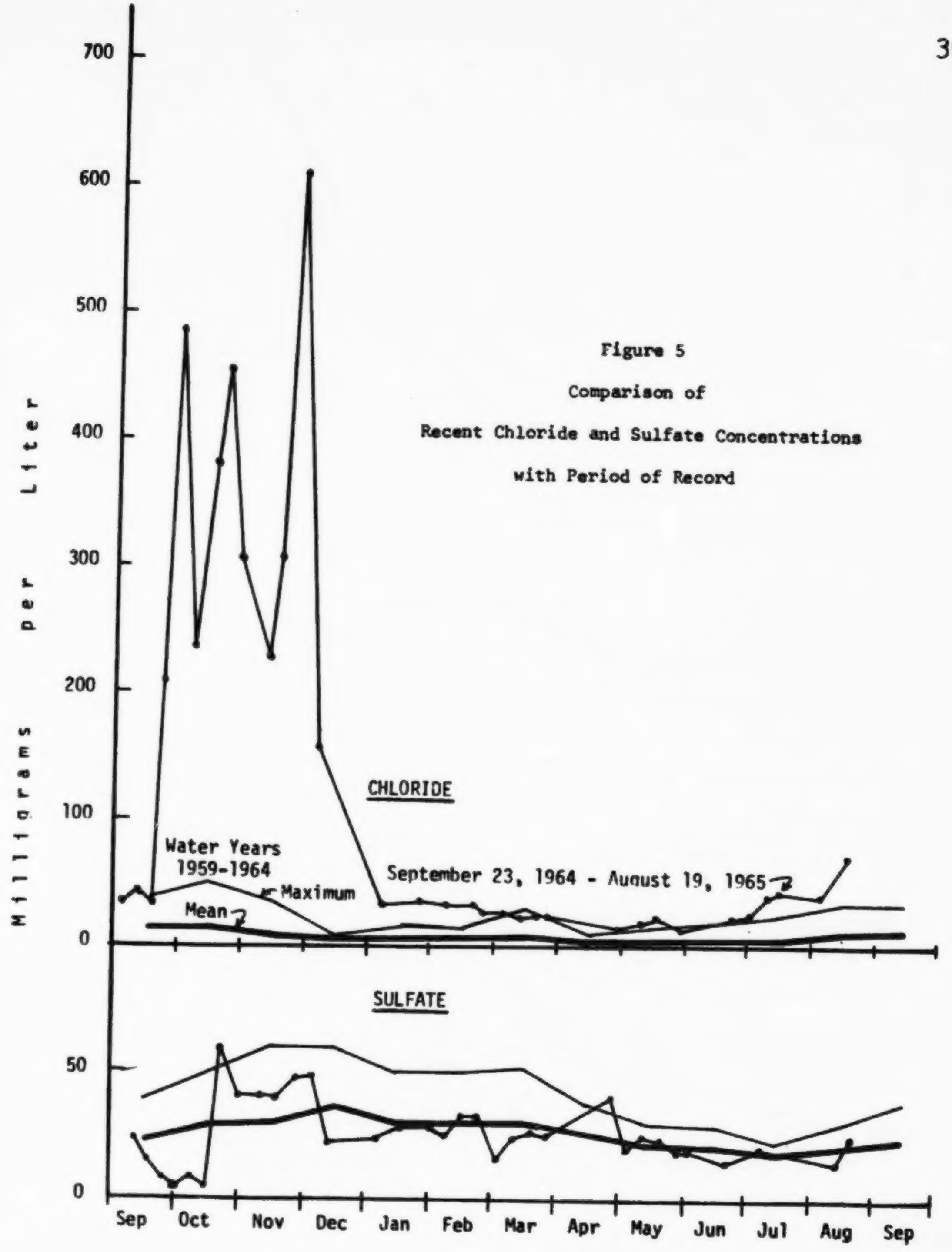


Figure 5
Comparison of
Recent Chloride and Sulfate Concentrations
with Period of Record

Comparison of Figures 2 and 5 indicates that a similar, possibly greater, increase in chlorides is a virtual certainty again this year because of the longer period of even lower flows than those of 1964.

The lack of an increase in sulfates similar to that for chlorides is noteworthy. The normal ratio of sulfate to chloride in sea water is 0.14. The maximum chloride concentration of 605 mg/l found on November 25, 1964, corresponds to about 3% sea water. On this basis, and assuming a sulfate level of 25 mg/l in the river, a resulting sulfate concentration of 100 mg/l would be expected. The difference between the expected and observed values probably reflects the reduction of sulfate during the period of travel, measured in months, within anaerobic bottom waters of the lower estuary.

Concentrations of minor constituents are listed in Table 1. These are based on four composited samples collected between October 1962 and September 1964. In addition to those listed, sodium varied from 5.9 to 52 mg/l, potassium from 0.09 to 4.0 mg/l, and fluoride from 0.015 to 0.26 mg/l.

Table 1

OCCURRENCE OF MINOR CONSTITUENTS IN HUDSON RIVER AT POUGHKEEPSIE

October 1962 - September 1964

	Percent Occurrence	Average Concentration of Positive Samples ug/l	Minimum Level of Detectability ug/l
Zinc	100	57	-
Cadmium	0	-	1.0
Arsenic	0	-	10
Boron	100	34	-
Phosphorus	75	23	4.0
Iron	100	58	-
Molybdenum	25	9	2.0
Manganese	75	2.1	0.8
Aluminum	100	32	-
Beryllium	0	-	0.03
Copper	100	11	-
Silver	0	-	0.3
Nickel	0	-	1.0
Cobalt	0	-	1.0
Lead	50	10	3.0
Chromium	75	6	3.0
Vanadium	0	-	2.0
Barium	100	26	-
Strontium	100	103	-

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Figure 6 summarizes the physical and radiological quality of the water. pH is generally between 7.0 and 7.6, with higher values in recent years. Turbidity and suspended solids also showed increasing trends during the record period, although the levels are still low.

Beta activity, particularly in the dissolved fraction, followed the normal pattern for the conterminous United States resulting from nuclear weapons testing (5). Strontium-90 values were also in accord with those from other stations and well within limiting values established by the National Council for Radiation Protection (6). Strontium-90 levels observed to date are listed in Table 2.

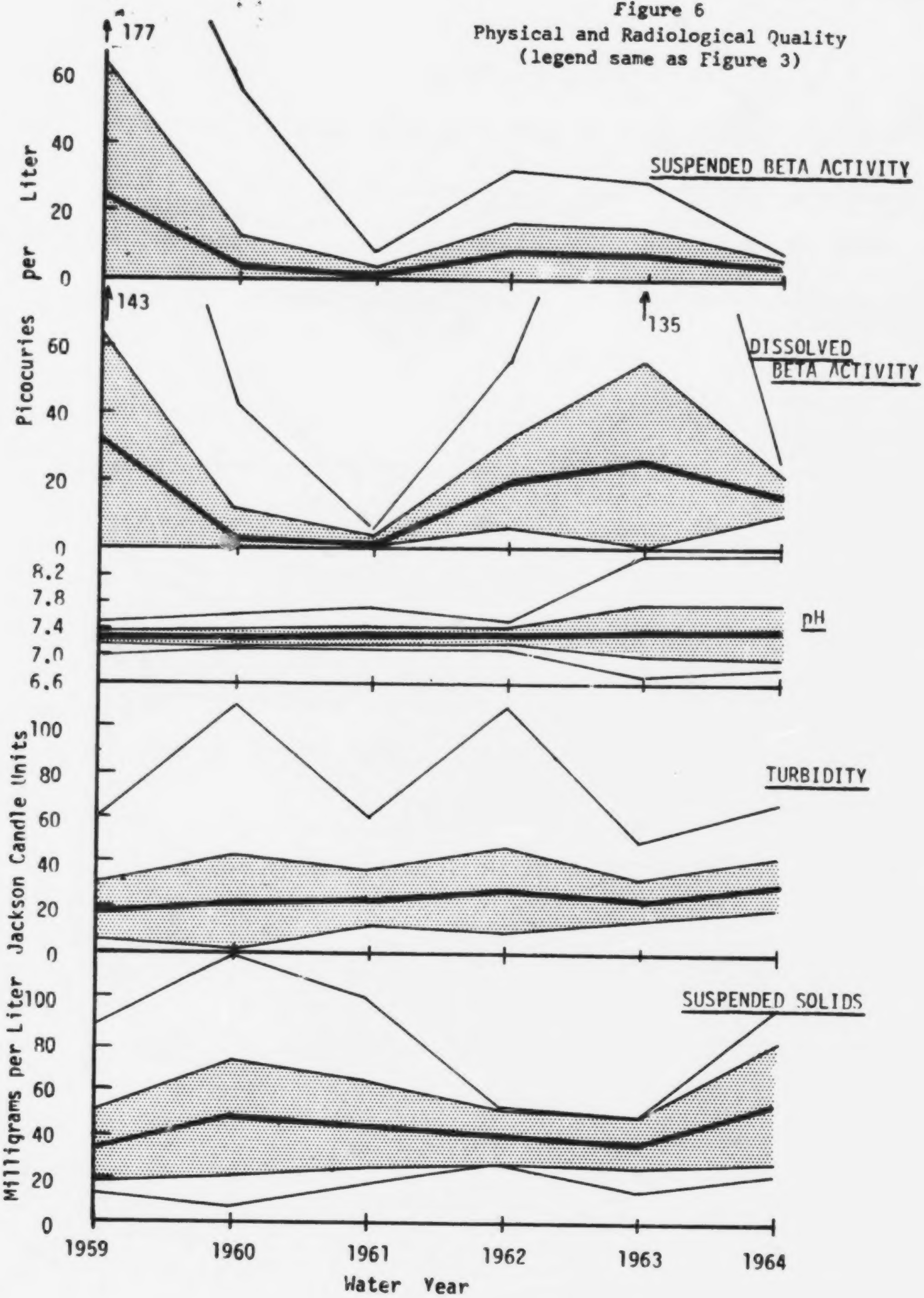
Table 2

STRONTIUM-90 IN HUDSON RIVER BELOW POUGHKEEPSIE, NEW YORK

Picocuries per Liter

Water Year	Oct.- Dec.	Jan.- March	April- June	July- Sept.
1959	-	4.5	1.1	1.0
1960	1.3	1.7	0.7	0.1
1961	0.4	0.4	0.51	0.24
1962	2.5	1.07	1.66	-
1963	3.02	-	3.81	-
1964	5.03	-	2.07	-
1965	2.03	-		

Figure 6
Physical and Radiological Quality
(legend same as Figure 3)



Selected carbon adsorption method and grab samples have been analyzed for organic materials. To date, only samples from the low-flow month of September have been examined. Specific identifications of organic materials have been limited to chlorinated hydrocarbon pesticides. Table 3 shows that dieldrin was always present. Similarly, evidence of endrin, DDE, DDD, and lindane was found more than half the time. There were occasional indications of lindane and heptachlor epoxide. DDT and heptachlor were never found. In all cases, the concentration levels were very low.

Figure 7 shows the population levels and dominant genera of plankton algae. Table 4 lists the genera according to the code shown on the figure.

Figure 7 shows that plankton levels are generally low and dominated by the centric diatoms _Cyclottella_ and _Melosira._ The single high count which has been found to date was due to a bloom of _Coccochloris._

Table 3

OCCURRENCE OF CHLORINATED HYDROCARBON PESTICIDES IN THE HUDSON RIVER BELOW POUGHKEEPSIE

Concentrations in picograms per liter (parts per trillion)[a]

Dates(s)[b]	9/3-10/58	9/2-9/59	9/7-15/60	9/11-21/61	9/5-17/62	9/20-30/62	9/23 1964
Dieldrin	<1	<1	<1	<1	<1	<1	8
Endrin	P	<1	<1	<1	ND	ND	ND
DDT	ND	ND	ND	ND	ND	ND	ND
DDE	<1	<1	<1	P	P	ND	4
DDD	<1	<1	<1	ND	<1	<1	ND
Aldrin	ND	ND	ND	P	ND	ND	P
Heptachlor	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND	P	ND	ND
Lindane	P	P	ND	ND	P	P	ND

ND - Not detected.

P - Presumptive. Results of chromatography were highly indicative but did not meet all requirements for positive identification.

Note:

a. Concentration values shown for carbon adsorption method samples are calculated from quantitative gas chromatographic analysis of the aromatic fractions of the carbon chloroform extract, and may be assigned the units of picograms per liter. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

b. Dates indicate beginning and ending of carbon filter runs except for grab sample collected 9/23/64.

Figure 7

Plankton Algae and Dominant Genera (see text for key to code numbers)

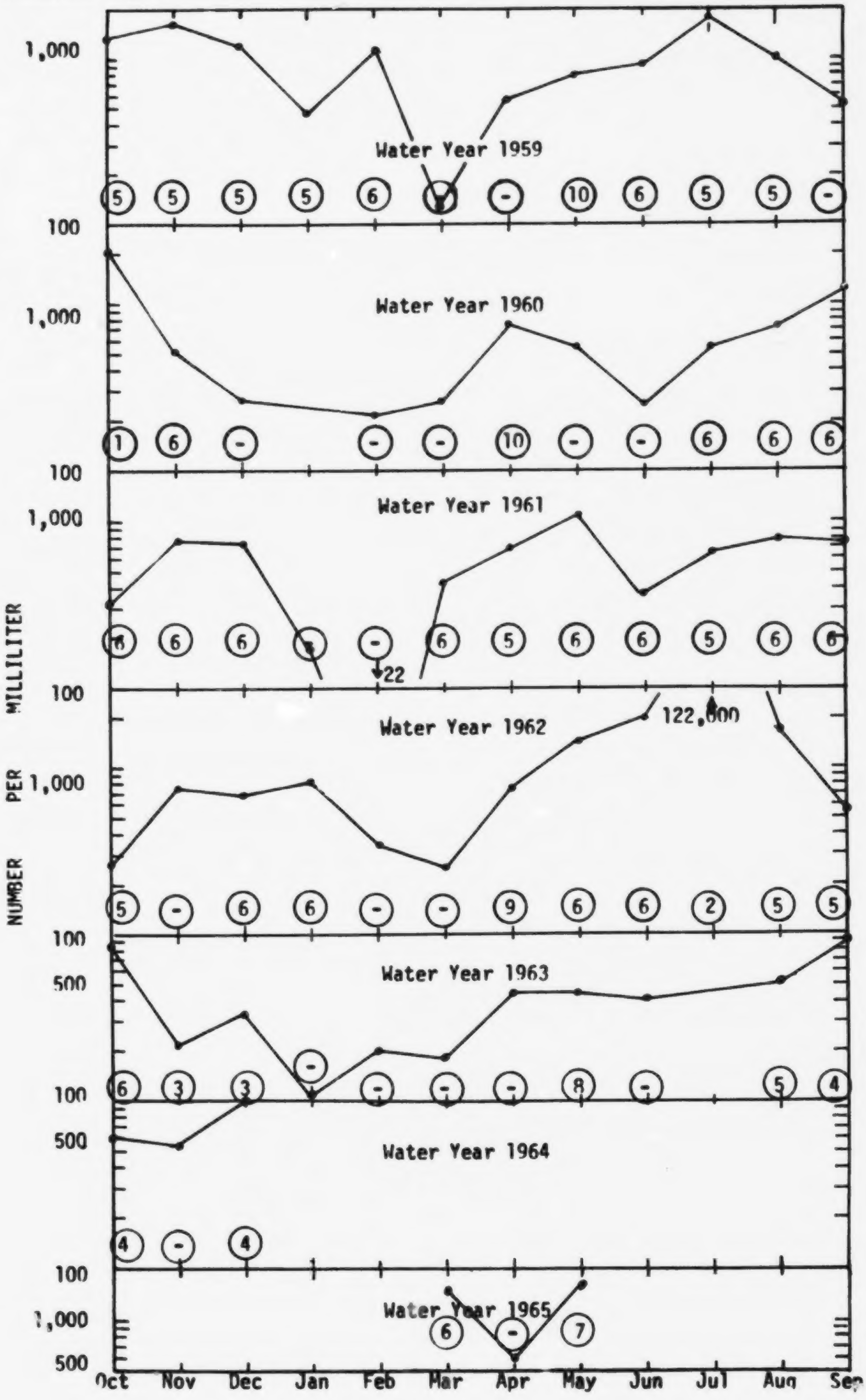


Table 4

KEY TO GENERA OF PLANKTON ALGAE

No.	
	Blue-green algae
1	Anacystis (microcystis)
2	Coccochloris
	Coccoid-green algae
3	Ankistrodesmus
4	Scenedesmus
	Centric diatoms
5	Cyclotella
6	Melosira
7	Stephanodiscus
	Pennate diatoms
8	Asterionella
9	Diatoma
10	Synedra

Paul De Falco

Summary

Examination of Water Pollution Surveillance System data for the Hudson River below Poughkeepsie for the period from 1958 to the present reveals the following:

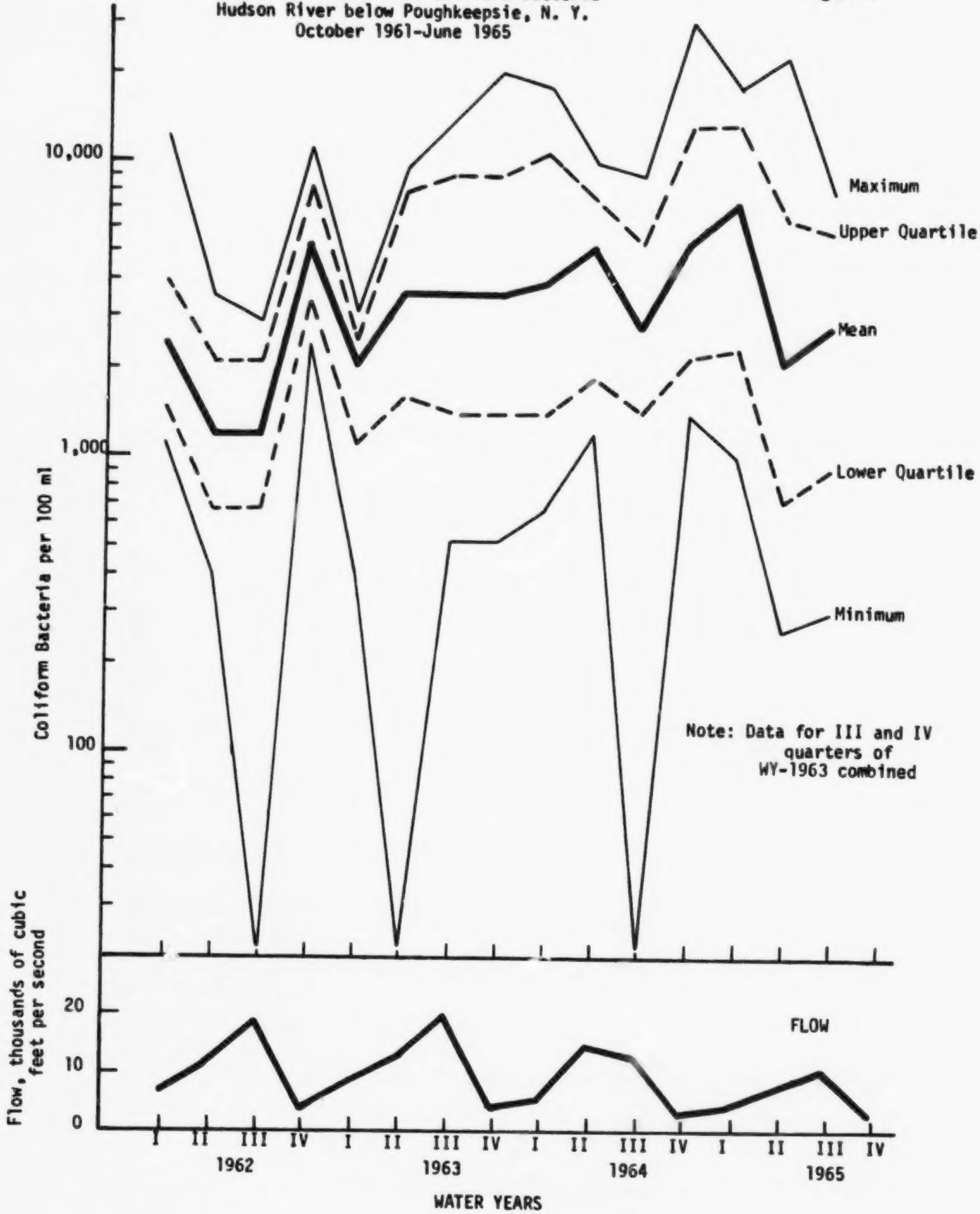
Dissolved oxygen levels were generally between 6 and 12 mg/1, BOD varied from about 0.6 to 3.4 mg/1, and COD increased to an average of 22 mg/1 in WY-1964. Coliform bacteria levels indicate significant pollution

The recent drought caused large increases in chlorides during the fall of 1964 due to sea water intrusion; this is expected to be repeated in 1965. Concurrent increases in sulfate were not found, suggesting that sulfate reduction took place in the lower estuary.

Surveillance for trace constituents, radioactivity, and plankton showed levels and variations generally consistent with those for eastern streams. A single plankton bloom due to the blue-green algae, Coccochloris was found. Chlorinated hydrocarbon pesticides were present in all samples examined but at very low concentrations.

Figure 8 shows a further examination of coliform bacteria below Poughkeepsie, New York.

Figure 8



Seasonal Variations of Coliform Bacteria
Hudson River below Poughkeepsie, N. Y.
October 1961-June 1965

Note: Data for III and IV quarters of WY-1963 combined

Paul De Falco

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5. Weaver, L., Hoadley, A. W., and Baker, S. "Radioactivity in Surface Waters of the United States, 1957-1962." Radiological Health Data, 4 (6):306-316 (1963).

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MR. STEIN: As you can see, we have taken quite a mouthful at one fell swoop. We will now have a recess of ten minutes, and then reconvene.

(Whereupon a recess was had.)

MR. STEIN: May we reconvene?

Our next participant will be Dr. Clarence M. Tarzwell, who is our foremost aquatic biologist.

Dr. Tarzwell has assured me that he is going to wake you up. He is one of our most engaging speakers anywhere.

Dr. Tarzwell.

STATEMENT OF DR. CLARENCE M. TARZWELL, DIRECTOR, NATIONAL MARINE WATER QUALITY LABORATORY, UNITED STATES PUBLIC HEALTH SERVICE, WAKEFIELD, RHODE ISLAND

DR. TARZWELL: Mr. Chairman, members of the committee, ladies and gentlemen:

If the water quality of the Hudson River is restored to conditions comparable to those occurring some 175 years or more ago, what can we expect as a result of this restoration?

In order to answer this question, I think that we should answer three others:

Dr. Clarence M. Tarzwell

1. What were the conditions during the period of early colonial times?

2. What changes have taken place, and what have been the results of these changes?

3. What will be the short and long-term effects of the improvement of environmental conditions in the Hudson River?

I would like to discuss these three questions, with special reference to the effects on the aquatic biota, namely, the fish, the shellfish, and so forth, that occur in the Hudson River. In doing this, we will have to use a general approach, and we will have to be guided in part by what has occurred in other streams.

For instance, what do you know of the environmental conditions under which your grandfather lived, or his activities, or the hardships he had to endure? The younger generation is not very much interested in what has taken place before. It is only when they get older that they start asking the questions.

We know very little of how things were in detail, and we find that the people take for granted the conditions that existed in their lifetime as being representative, and they have no idea really of what conditions used to be.

In fact, many of the people in the eastern part of the country have little idea of what a stream might produce in the way of fishes, and they accept some of the conditions as they are.

Like one fellow said, he thought that the smell of the paper mill is usual, and I had a co-worker with me whose wife was brought up on the canals in Holland, and she said, "I just love the smell of sewage."

(Laughter.)

I think many people in this part of the country are not as belligerent, let us say, or as pushy, in their ideas of what should be done in the way of pollution abatement or the protection of aquatic resources, as are those in, say, Washington or Oregon, where they have their resources still with them.

In colonial times we know that things were much different. We know what happened to some streams. We know that the water was clear; that the flow was more uniform; the floods were not as great; the low water was not as low; there was less surface runoff; and more seepage because of the forest conditions; there was more spring flow; the water was cooler; there was more shade and also more spring flow which determined this; and the DO levels were generally higher.

In fact, in most of the natural streams, they approached saturation most of the time. There were no dams to stop the runs of anadromous fishes. There was less organic enrichment, and there were no toxicants added by man's activities.

The fish were abundant, especially the anadromous forms. Salmon occurred in all New England streams that were suitable for them -- that is, that didn't have falls near the marine waters -- in very large numbers. In fact, one of the main complaints that the servants in Connecticut had was that they were eating so much salmon, and they got up a resolution, or, let us say, a labor union rule, if they had such things, that they were not to receive salmon more than twice a week.

The salmon then were in tremendous numbers, and some said that they could almost walk across the stream on their backs. Other people said it bothered the horses when they were crossing the streams, or they could go out with the wagon and with pitchforks spear enough salmon to last them for a long time.

However, the salmon began to decline in about 1800 in Connecticut. They put a dam up on the Connecticut River near the Massachusetts-Vermont line, and the salmon started down. This dam was built in 1798 and it was 16 feet high.

Dr. Clarence M. Tarzwell

In the late 1840's, there was a dam in Holyoke, Massachusetts, and this ended the salmon.

Before that, of course, they sold them, and there were shad, of course, and other anadromous species; but the fishermen in Connecticut required that when you bought a certain number of shad, you had to take a certain number of salmon. They wanted to get rid of them.

The shad has been another species that occurred in large numbers. Its abundance, however, in the Hudson has fluctuated widely.

Between 1915 and 1932, there was a gradual decline. The commercial shad catch was at a low level. Then in the period, 1934 to 1945, the shad catch was high. It came up, almost as high as it had been in the peak in the later 1800's.

Shad migration is limited in the Hudson by the dam at Troy. The greatest spawning activity now has in years past taken place between Castleton and Coxsackie, but the shad catch has been decreasing since 1945, and it has decreased sharply since 1960. The shad is of poor quality and there has been difficulty in marketing because of the tainting of the flesh.

We know that fish readily take up tainting in streams receiving wastes, especially from oil or phenols, and the complaint is that the flesh of these fish has a taste of oil.

The quality of the fish in general is low in the Hudson, and the commercial fishery has dropped off not only because of pollution -- that is, it reduced the numbers -- but also because the fish themselves were tainted and they did not have a market.

Also, the carp that came here and was introduced, which then had very large numbers, has really dropped off. There is no market for them. The carp from the Hudson River cannot be sold in New York because they are tainted. Those that are sold are brought in from other areas.

The white perch, the catfish and the bullheads, are also tainted. Some say they taste of oil and sewage.

The striped bass has been decreasing recently. Its flesh also is tainted.

The alewives have increased in certain areas, probably largely due to the organic enrichment due to the wastes that have come into the stream, but they too are tainted.

The herring, the shad and the alewives come up in May. There have been reoccurring kills of these fish in the Hudson, largely beginning in June. They cannot stand high temperatures, and high temperatures in combination with low DO is more than they can take. So there have been yearly kills of these fish -- not all of them, of course, but kills.

Power plants and industries along the Hudson, as has been brought out already, are adding heated water to the Hudson, and probably have some effect on the temperature of this river. With low flow, of course, the water tends to heat up more, and these are the critical times.

Below Albany, as has been brought out, there is an oxygen block, where the dissolved oxygen is very low, and where the fish cannot get through it. However, it starts developing in June, and the block forms late in August and September, in the fall months. This prevents some migration of fishes.

However, a few do get through, but there are kills, and some that do get through even go through the locks and up above Troy, especially the alewives and the striped bass.

The DO levels are also low in the lower river here. I have seen average figures, but, of course, averages, from the standpoint of oxygen, mean very little or nothing. They can be misleading. It is the streams that are important. It is the stream levels that are determining whether or not the fish are going to survive, and I would assume from what averages I have seen, that at times the oxygen does become quite low in certain parts of this lower area of the Hudson near New York, and perhaps at the bottom may become real low.

Kills of menhaden have taken place here in this lower section of the mouth of the river, and they are almost an annual occurrence.

The sturgeon, which was one of the outstanding fish in the Hudson -- the Hudson River was not a salmon stream, really, although Henry Hudson reported many salmon; but, you see, it is an estuary really up until about above Albany, and up that way, and there was a falls there. They caught very few salmon and it was never really successful, and we cannot consider the Hudson as a salmon stream. However, the sturgeon were of great importance, and it is this species of fish, or this group of fish, that perhaps has suffered.

The sea sturgeon, of course, was very abundant here, the short-nose sturgeon and several other species, but these are the two main ones. Fish of 300 pounds and more have been taken, and there was a great market for them.

In the Albany vicinity, they were known as

Albany beef, and in the late 1800's a very great commercial fishery, but this is gone. The sea sturgeon have declined. The fishery, for all practical purposes, is gone. The short-nose sturgeon is practically gone. It is off the market.

This change is quite important from the standpoint of commercial fishery and food.

There has also been a change in the bottom material. Sludge has settled out. There is an oily sludge over certain areas, and over some quite extensive areas, at the bottom of the stream.

This usually results in a material just barren of bottom organisms, which, under normal conditions, act as the principal food of many of the species of fishes.

The bottom organisms themselves, in the short study that has been made, it has been found are absent from certain areas, except the area below Albany.

Generally speaking, it is the sludge worm that is the dominant form throughout the whole length of the river where fresh water prevails, and in the salt water a couple of the marine worms.

Where conditions improve a little bit, there is the snail and the fingernail clam. Both of these are indicative of organic enrichment or pollution.

The bottom is producing very little in the way of fish food, and it is showing up, of course, in some of the species.

It is felt that the reason for the decline of the sturgeon has been the dredging and the change in the bottom. The deposits on the bottom, since the sturgeon are somewhat bottom feeders, are quite important and perhaps is one of the main reasons for its decline, as well as other conditions being unfavorable.

What few studies have been made indicate that at times there are blooms, and blooms of the species which were found to be harmful there to the oysters in the Bay at Long Island. Algae can become very abundant.

As to the oysters, these were once abundant in the lower river, and even in the East River.

In the borings made for the Tappanzee Bridge, very large deposits of oyster shells were found, even up to depths of pretty near 50 feet. The oysters themselves were tainted so that the market for them was adversely affected, even before conditions became so bad that they were largely wiped out.

However, there are two areas still here that have an oyster bed, but there has been no production in this area since 1961.

Some oysters were produced commercially in

Princess Bay as late as 1900, but we can write them off, I think, at the present time.

Clams are somewhat the same way. The soft-shell clams seem to have disappeared in the river, and the hard-shell clam is practically gone. There are quite a few of them, however, in Raritan Bay.

Crabs were no longer on the market here in New York in 1887. It was said at that time that they were tainted, that there was a coating of oil, and that the flavor of them was undesirable.

The lobsters disappeared at about the same time from the market. They used to be quite abundant, and good catches of them were made from the piers on Staten Island, so that we know that they were over in this area, but they too were tainted. As far as seems to be known, they have really disappeared, as far as any practical considerations are concerned.

In addition to this, the esthetic values have been adversely affected, and this is very important. It is unsightly. The people do not like to swim or boat or ski in such an area esthetically, even though it might be safe. There have been great decreases in these activities, and these are serious losses.

What can be done with this, and what would be the effect if there were a clean-up?

Some of the effects will be rapid; others will be very slow. It is going to take time to clean up these bottom areas, even though the wastes are taken care of, and it **is going** to take time for the various organisms to reestablish themselves and become abundant as a fish food, so that if water conditions are improved, probably the plankton feeders will come back fairly rapidly.

If there is improvement, the oxygen blocks will be removed, turbidity will decrease, the shad and striped bass will probably increase fairly rapidly, the alewives will come along, and the fish will no longer be tainted.

As to the fish that are there now -- there are some -- there could be a commercial fishery. There will be a commercial fishery, without a doubt, if this tainting is taken care of. The clams and oysters can be expected to reappear.

However, it should be pointed out that much of the bottom has been rendered unsuitable due to the bringing in of fill or other materials, or the deposition of sludge, so that it could be some time before they would come back. It is anticipated that the crabs would come back, and, aside from the aquatic life, there would be more and better water for domestic use.

The area would become favorable for recreation, such as swimming, boating and skiing. The esthetic values would be improved.

However, this is a long-term project, costing a great deal of money, and it must be backed by a desire of the public to clean it up. The public must appreciate the importance, and they must be willing to tax themselves and to continue to do it, if we are going to meet this problem.

The population is increasing. We have now passed the point where nature can take care of it.

In the past, we depended on nature. We have used nature to the fullest, and we have gone on beyond nature, so that the streams have been polluted, and if we are going to meet the problems of the future, it means we are going to have to accept the cost of taking care of these wastes. This is not going to be a small item.

In approaching this, I think the obstacle perhaps is the attitude of the people. The attitude of the people must be changed. Our present attitude is, well, rather lackadaisical. We don't care and do not take an interest.

When we put our wastes together and put them in the sewer underground, everyone just likes to disclaim any responsibility for it. They think nothing of it. They are put into the stream and it is the neighbor's drinking water.

Now, you know that it would be socially unacceptable for you to take your garbage and put it over on your neighbor's front yard. You just would not do it. It is socially unacceptable, and it wouldn't be heard of.

However, there seems to be little or no social stigma attached to putting your fecal matter in your neighbor's drinking water.

Think of that for a minute! This applies to several other approaches in an attitude of the people.

As the population increases, we have to accept the responsibility.

We have heard the expression, "free as air or cheap as dirt."

Well, clean air is no longer cheap, and if you tried to buy some real estate, you know dirt is no longer cheap.

In the same way, water is not in such abundance that it can be cheap. Water is not a luxury. It is a necessity of life, and we have to have it. Water is worth whatever we have to pay to get it, and if you are thirsty enough, you will give all of your worldly possessions for one swallow.

Let us hope that we will have the foresight, that we will have the ability, and that the American public will meet the problem in such a way that we will have water, and we will not be brought to these straits.

MR. STEIN: Thank you very much, Dr. Tarzwell.

(Applause.)

MR. STEIN: May we reserve comments or questions until after the next speaker?

Again, I might say that Dr. Tarzwell is our leading aquatic biologist, and he, I think, internationally is regarded as America's, if not the world's, leading aquatic biologist in the field of water pollution control.

Dr. Tarzwell has just taken over our installation at Kingston, Rhode Island. I think they call it Kingston. What is the address in Rhode Island?

DR. TARZWELL: Davis Hall, Kingston, Rhode Island.

MR. STEIN: That installation will establish salt water standards, or specialize in that, under the new Water Pollution Control Act.

Mr. Anderson?

MR. ANDERSON: We have one more statement, to be presented by Mr. Lester E. Blaschke, Chief, Office of

Estuarine Surveillance and Sanitary Control in our shellfish program.

He will present a statement of interest on the national shellfish sanitation program.

STATEMENT OF LESTER E. BLASCHKE,
CHIEF, OFFICE OF ESTUARINE SURVEILLANCE AND SANITARY CONTROL,
SHELLFISH SANITATION BRANCH,
DIVISION OF ENVIRONMENTAL ENGINEERING AND FOOD PROTECTION,
UNITED STATES PUBLIC HEALTH SERVICE

MR. BLASCHKE: Mr. Chairman, conferees, ladies and gentlemen:

My name is Lester Blaschke. I am Chief, Office of Estuarine Surveillance and Sanitary Control, Shellfish Sanitation Branch, Division of Environmental Engineering and Food Protection, United States Public Health Service. My statement of interest in the Conference on the Abatement of Pollution in the Hudson River and its Tributaries is made within the framework of the National Shellfish Sanitation Program -- a consumer-protectionoriented program administered jointly by the States and the United States Public Health Service.

Mr. Chairman, I would like to summarize my statement and present the entire statement for the record.

MR. STEIN: Without objection, that will be done.

MR. BLASCHKE: Thank you.

We are directly interested in the pollution profiles of the Hudson River. Lower portions of the river are tidal and under suitable conditions have supported a valuable shellfish resource. In addition, the water quality conditions in the lower portion of the river determines, in part, the sanitary quality of the water overlying the existing shellfish beds in the three-bay area of Lower Bay, Raritan Bay and Sandy Hook Bay, often elsewhere and hereafter referred to herein as Raritan Bay. The shellfish from a portion of this area may be shipped in interstate commerce. As part of my statement I want to document the historical relationship between water pollution and shellfish.

Technical Considerations.

Oysters, clams and mussels have an unusual potential for the transmission of disease to man. This unusual potential can be attributed to three factors:

(1) The environmental growth tolerance of shellfish is such that they ordinarily grow only in estuaries in which there is an admixture of fresh and salt water. These are also areas most subject to pollution with both industrial and municipal wastes.

(2) Shellfish are filter feeders. In the process of feeding they pump large quantities of water across their gill systems. Particulate material and dissolved substances are removed and concentrated to levels above that of the overlying waters. Quahogs (Hard Clams - Mercenaria mercenaria), during periods of active feeding, concentrate bacteria to a level of 2.5 to 6.0 times that of the overlying water. The concentration factor for metals, industrial wastes or pesticides, is much greater.

(3) Shellfish are frequently consumed raw or with little cooking. The entire animal is eaten.

It has been demonstrated many times that these factors can combined to transmit human illness. Typhoid fever has been historically linked with polluted shellfish, but in recent years infectious hepatitis has been the prime offender. There have been no recognized instances in the

United States in which shellfish have carried a sufficient burden of industrial wastes to cause acute illness. However, in Japan 83 cases of severe mercury poisoning were originally attributed to waste discharged from a plastics manufacturing plant. Carcinogens and pesticides have also been identified in shellfish.

Use of shellfish as food, then, demands that great care be exercised to assure that harvest or culture areas are reasonably free of undesirable pollutants. By similar reasoning, great care must be exercised to prevent the harvesting of shellfish for direct marketing from any areas which are not of satisfactory quality. These two elements are, in fact, the underlying principles of the National Shellfish Sanitation Program.

Historical Considerations

The National Shellfish Sanitation Program was initiated in 1925. This action was taken in the wake of a major outbreak of typhoid fever attributed to oysters. Two public forces were in action. On the one hand, the protection of the public health demanded action to prevent the continued transmission of preventable disease through a food product. On the other, the shellfish industry recognized that they could not sell their product unless public confidence could be restored and maintained. These two forces, acting in concert, resulted in the appointment of a special advisory committee to the Public Health Service to determine if these plural goals were compatible and to recommend corrective action.

The special committee concluded that this was possible and recommended establishment of a coordinated national program with primary administrative authority vested with the States. This program, initiated in 1925, is still in effect. The States of New York and New Jersey are participants in this program and their sanitary control measures are currently endorsed by the Public Health Service as meeting the sanitation standards of the National Shellfish Sanitation Program.[1]

Shellfish as a Natural Resource

The estuaries and their biological populations have long been recognized as a valuable natural resource. In fact, colonial statutes hopefully designed to assure the wise use of this resource antedate most other conservation measures in the United States. Unfortunately, this concept passed into a period of eclipse -- at least insofar as water quality was concerned during the very period in which degradation of estuarine water quality was most prevalent. It now shows signs of emerging.

The National Shellfish Sanitation Program, as established in 1925, has a twofold base: (1) safe use of a resource; and (2) conservation of a resource. This dual concept was reaffirmed by action taken at the 1964[2] National Shellfish Sanitation Workshop, which adopted a positive statement to the effect that the estuaries represented a valuable, manageable, natural resource -- similar in many respects to forests, land, air or fresh water -- and that shellfish culture represented a beneficial use of this resource. Mr. Wesley Gilbertson, Chief, Division of Environmental Engineering and Food Protection of the United States Public Health Service, stated this need at the Fifth National Shellfish Sanitation Workshop[2] as follows:

> "3. We need to see that the water quality needs of the shellfish program receive proper recognition in long-range water pollution control planning or water resource planning."

It does not, of course, follow that shellfish culture is the only beneficial use, or that it is the most important beneficial use. But clearly, and for several hundred years of our history, shellfish culture has represented a beneficial use of a natural resource -- the estuary and its tributary streams.

In general terms this suitability of an estuary for shellfish growth to be harvested for food use can be readily shown in tabular form:

	Microbiological Contaminants	Chemical Contaminants	Physical-Chemical Environmental Changes
Normal Reproduction and Growth	Least	Equal	Most
Suitability as Human Food	Most	Equal	Least

The quality of water in an estuary is the algebraic sum of the qualities and quantities of the input fresh and salt water, giving due weight to relative effects of the conservative versus the non-conservative "pollutants." This is not the time or place to elaborate on all factors which enter into this equation. However, in terms of the fresh water input, these elements include such factors as:

(1) Total pollution added to stream with consideration for variables such as intermittent degrees of treatment, or to sewage by-pass during period of storm.

(2) Decay rate of pollutant.

(3) Time of transport for pollution source to estuarine shellfish area. During storm period -- when overflows may take place from combined sewers -- the time of transport may be lowest.

(4) Technical feature of sewerage system such as automatic overflows or combined sewers. For example, during storm flow as much as 95 percent of the sewage may by-pass a treatment plant. On an annual basis this might amount to only 3-5 percent, but shellfish are not eaten on an annual basis. They represent the quality of the water at the time of harvest -- assuming environmental conditions are suitable for their activity.

(5) Physical characteristics of the estuary and tidal influence which determine relative proportions of salt and fresh water, e.g., salinity and the dilution and transport of contaminants.

Affected Shellfish Areas

How do these factors apply to the Hudson River and the downstream estuarine area of Raritan Bay? What are the current values of these areas? As a prologue to the future, what was their past value as shellfish-growing areas?

Two areas are considered here: The lower Hudson River from the vicinity of Teller's Point to the Narrows and the affected area downstream referred to as Raritan Bay.

Lower Hudson River (Teller's Point to the Narrows). The shellfish classification description covering the Hudson River is divided according to the State jurisdiction as follows:

New York

> "The shellfish lands within Westchester County are in such sanitary condition that shellfish thereon shall not be taken for use as food, and all such shellfish lands are designated uncertified (closed) areas.
>
> "The shellfish lands within Bronx, Kings and New York Counties are in such sanitary

"condition that shellfish thereon shall not be taken for use as food, and all such shellfish lands are designated uncertified (closed) areas."

(Quoted from an "ORDER Constituting Statement of Sanitary Condition of Shellfish Lands in Marine District and Adjoining Waters" as adopted effective March 20, 1965, by the New York Conservation Department.)

New Jersey

"S-D3

February 1964 Rules and Regulations

"The State Department of Health of the State of New Jersey pursuant to the authority vested in it by Chapter 177, Laws of 1947, hereby establishes the following rules and regulations for the administration of revised statutes 24:2-1 and 24:14-2. All prior rules and regulations in these matters adopted on various dates by the Department of Health of the State of New Jersey are hereby rescinded.

"/s/ New Jersey State Department
of Health
by Roscoe P. Kandle, M.D.
State Commissioner of Health"

"Effective Date: February 15, 1964.

"Filed with the Secretary of State,
February 14, 1964.

"The State Department of Health hereby condemns all oyster, clam and mussel growing areas or other places from which oysters, clams, or other shellfish are or may be taken, at all times of the year except when otherwise noted, in:

"1(a) All the waters of the State lying west and north of Raritan Bay.

* * *

"2. Raritan Bay and Lower Bay:

"(a) All of the waters of Raritan Bay and Lower Bay and tributaries thereof.

"3. Sandy Hook Bay:

"(a) All of the waters of Sandy Hook Bay lying north and west of a straight

> line extending from Conover Light at Leonardo, New Jersey, to Sandy Hook Lighthouse."

* * *

In the days of the early settlers in the New York City area there were several references to the abundance of shellfish in the area, even to the extent that one source stated:

> "The waters surrounding Greater New York were at one time the world's finest oyster banks. There seems little doubt that, at the time of the settlement of New Amsterdam, their waters contained more than 50% of the world's available supply of oysters."[3]

A map of oyster grounds prepared in 1767 showed the shellfish area which has been described as follows:

> "The time was when the entire waters west of the channel, beginning south of Jersey City and surrounding Ellis and Bedloe's Islands and Robbin's Reef and a little way beyond Constable Point, up the Kill Van Kull, together some six miles in a straight line, was a rich bank of native oysters

> "which was supposed to be inexhaustible. This bivalve once flourished as high up the Hudson as five or six miles above Teller's Point, and with some allowance for variation of locality, and oyster beds extended between this spot and Sandy Hook, being a distance quite fifty miles. Now taking this stretch with Raritan Bay, the 'inside' of Staten Island, and Newark Bay, there would be an expanse of waters of not less than three hundred and fifty square miles, at least half of which would, probably constitute oyster grounds of varying richness."[3]

The decline of this area as a shellfish resource was reported to be caused as follows:

> "The elimination of these beds as a source of supply of oysters may be divided into three major phases or periods as follows:
>
> "(1) 1621 - 1850 Depletion due to wasteful exploitation.
>
> "(2) 1850 to date Beginning of pollution by manufacturing wastes being

	"dumped into the streams. Manufacturing gained impetus during the Civil War and again during the World War.
3) 1870 - 1925	Pollution by raw sewage, the accumulated effects of which culminated in the condemnation of practically the entire area."[3]

The first Annual Report of the New York State Bureau of Marine Fisheries in 1911 had this to say about the effect of sewage disposal in this area:

> "The result of this class of sewage pollution is plainly shown in the destruction of the formerly great oyster beds in the Harlem River, the Hudson River, Upper and Lower New York Bay and the East River ***"[4]

Table I is an excerpt from a similar table appearing in the report: "Sewage Pollution - Effect on the Shellfish and Fishing Industries" as prepared by the Federal Works Agency under the sponsorship of the Interstate

Sanitation Commission (1939). This table gives the status of the use and classification of the referred areas at that time:

TABLE I

Waters	Total Area Acres	Acres Devoted to Shellfish Cultivation	Year Condemned	Acres Condemned
Hudson River to Tarrytown	6,000	950	1921	6,000
Harlem River	700	0	1921	700
East River	8,000	85	1924	8,000
Upper New York Bay	20,000	0	1921	20,000
Staten Island Sound Kill Van Kull Arthur Kill	2,500	800	1921	2,500
Lower New York Bay	20,000	500	1921	20,000
Raritan Bay	20,000	8,000	1921	20,000

Again in the early 1950's an effort was made to reestablish any oyster seed industry in the portion of the Hudson River near Tarrytown known as the Tappan Zee. For this purpose potential shellfish beds were surveyed and some 6,000 acres leased. These leases have been maintained since then. This new fishery, for the production of seed oysters, seemed to flourish at the start and was hopefully reported on in the New York State Conservationist (December-January 1953-54). However, as the result of undetermined causes largely associated with very high runoff, mortality set in and the oysters were largely killed off at least as a possible commercial venture under existing environmental conditions.

Raritan Bay (Lower Bay, Raritan Bay and Sandy Hook Bay). As noted in the above closure notices for New Jersey, all of the area except for a small portion of Sandy Hook Bay is closed for the taking of shellfish for direct market purposes.

The same situation exists in the New York portion of the bay and the wording of the official document is as follows:

> "The shellfish lands within Richmond County (Staten Island) are in such sanitation condition that shellfish thereon shall not be taken for use as food, and all such shellfish lands are designated uncertified (closed) areas."

Data relative to the shellfish production and potential for the Raritan Bay have been and undoubtedly will be covered in the reports relative to the "Conference on Pollution of Raritan Bay and Adjacent Interstate Waters." As reported in the transcript of the "First Session" of that conference, shellfish had been reaching the New York market from Raritan Bay in amounts of 20,000 to 30,000 bushels a year (1948-1960) which, at an average value of $6/bushel (based on 1961 prices), amounted to some $120,000 to $180,000 annually. This resulted at a time when the available area was greatly restricted by pollution closures. The amount of available shellfish is much greater than the above harvest rate. A recent study of the Northeast Shellfish Sanitation Research Center indicated that there is a standing crop of some 5,000,000 bushels of hard clams available in these waters.

Relationship of Water Quality in the Hudson to the Use as a Shellfish Area

Water quality may have an effect on the ability of the shellfish to survive and reproduce in a given area and it may also have a bearing on the use that may be made of the product that does grow in the area. In order for shellfish to be acceptable for direct marketing, it is necessary that the water quality in the growing area be adequate to meet the standards of an "approved" area.

Approved growing areas for the direct marketing of shellfish must have a sanitary survey prior to classification. This survey must offer evidence that pathogenic microorganisms, radionuclides and/or harmful industrial wastes do not reach the area in dangerous concentration. As a measure of the relative safety of the area, the coliform median MPN of the water should not exceed 70 per 100 ml (plus the use of ranges to limit the variability encountered) in those portions of the area most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.[1]

The New York State Department of Health Report No. 9 for the "Lower Hudson River" (From Mouth to Northern Westchester-Rockland County Lines)[5] dated as of 1960, shows in Exhibit No. 15 the average coliform density profiles for this section of the river. The coliform counts range between 60,000 and about 1,000 for the previous shellfish areas. This is far from an acceptable area for direct market shellfish use. In fact, with this level of sewage pollution, the only use possible within the National Shellfish Program would be to utilize the area as a seed bed from which relaying would later be conducted under rigidly controlled conditions.

Relationship of Water Quality in the Hudson to the Use of Raritan Bay

There will undoubtedly be considerable information made available in the final report of "The Conference on Pollution of Raritan Bay and Adjacent Interstate Waters," which will indicate the probable magnitude and extent of the influence of the water quality in the Lower Hudson River to that in the potential shellfish waters of Raritan Bay. The plot of the geometric means of the confirmed coliform means per 100 ml as shown on Figure 2 of the "Progress Report for the Conference on Pollution of Raritan Bay and Adjacent Interstate Waters -- Second Session" (April 1963)[6] shows median coliform values at the Narrows of some 20,000 with decreasing order of magnitude as it approaches the shellfish beds where levels in the order of some 10,000 MPN/100 ml are noted. The indications are that this pollution comes from the Lower Hudson River. Again, comparing the pollution levels with those acceptable for shellfish use, it may be seen that such shellfish will have little use except as a source of shellfish for a rigidly controlled transplanting operation.

Conclusions

1. Sewage and industrial wastes discharged to the interstate waters of the Hudson River determine, in part, the suitability of this area and the New York and Raritan Bays for the production and harvesting of shellfish used for food, and is a major factor in determining the present area classification.

2. Industrial wastes, discharged into the interstate waters of the lower Hudson River and New York and Raritan Bays is a probable factor in preventing the re-establishment of an oyster population in these waters.

References

(1) Jensen, E. T. (Editor). 1962a. Cooperative Program for the Certification of Interstate Shellfish Shippers: Part 1, Sanitation of Shellfish Growing Areas. Public Health Service, USDHEW, Publication No. 33. Revised 1962: 34 pp.

(2) Houser, L. S. (Editor). Proceedings - 5th National Shellfish Sanitation Workshop held November 17-19, 1964. Public Health Service, USDHEW.

(3) Sewage Pollution - Effect on the Shellfish and Fishing Industries. January 1939. Sponsored by The Interstate Sanitation Commission, 60 Hudson Street, New York, New York.

(4) Annual Report of Superintendent of Marine Fisheries. 1st Annual Report New York State Conservation Commission. 1911. P. 98-109.

(5) Lower Hudson River From Mouth to Northern Westchester-Rockland County Lines. Report No. 9 of the Lower Hudson River Drainage Basin Survey Series. Water Pollution Control Board, New York State Department of Health..

(6) Progress Report for The Conference on Pollution of Raritan Bay and Adjacent Interstate Waters. Second Session. Public Health Service, USDHEW. April 1963.

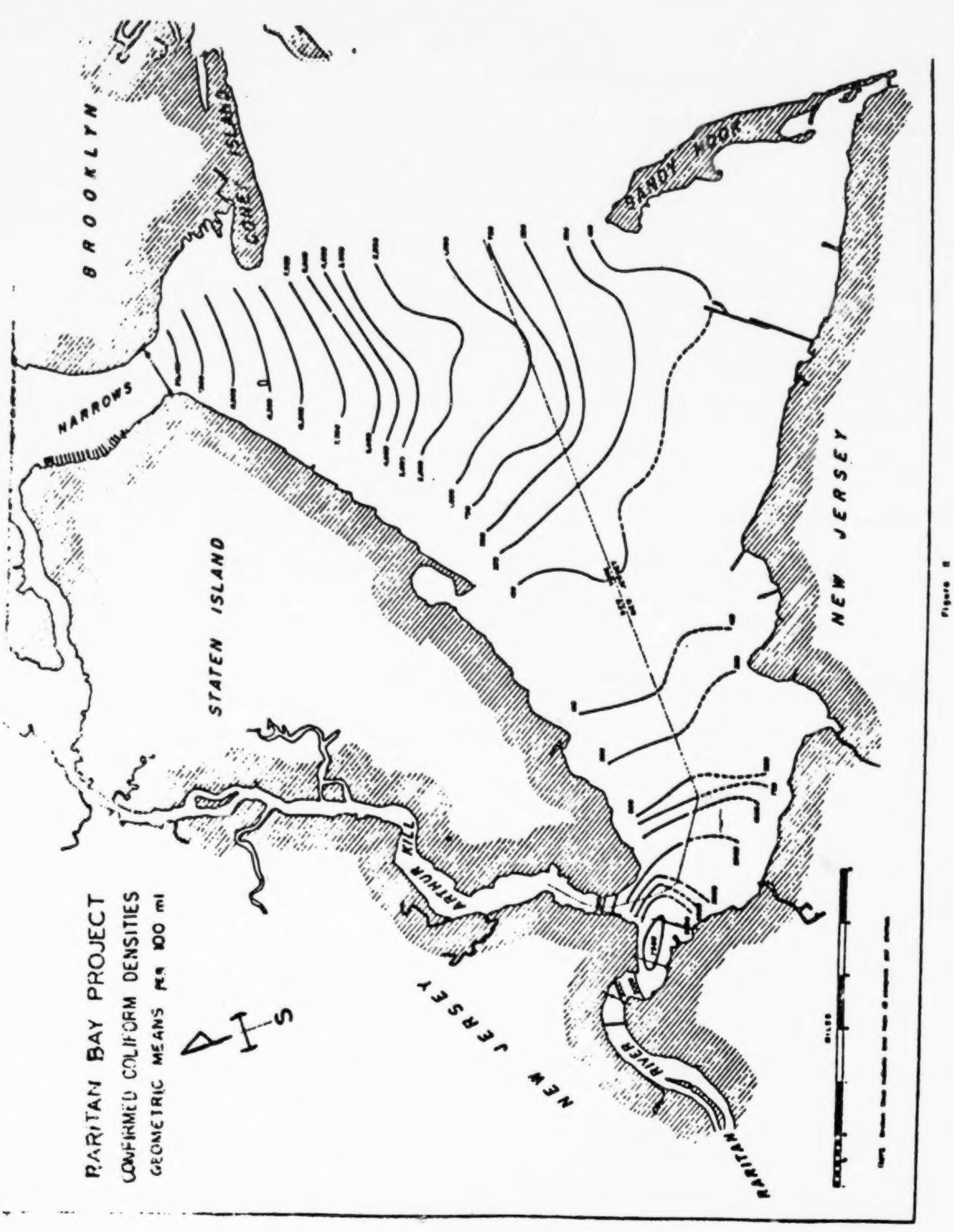
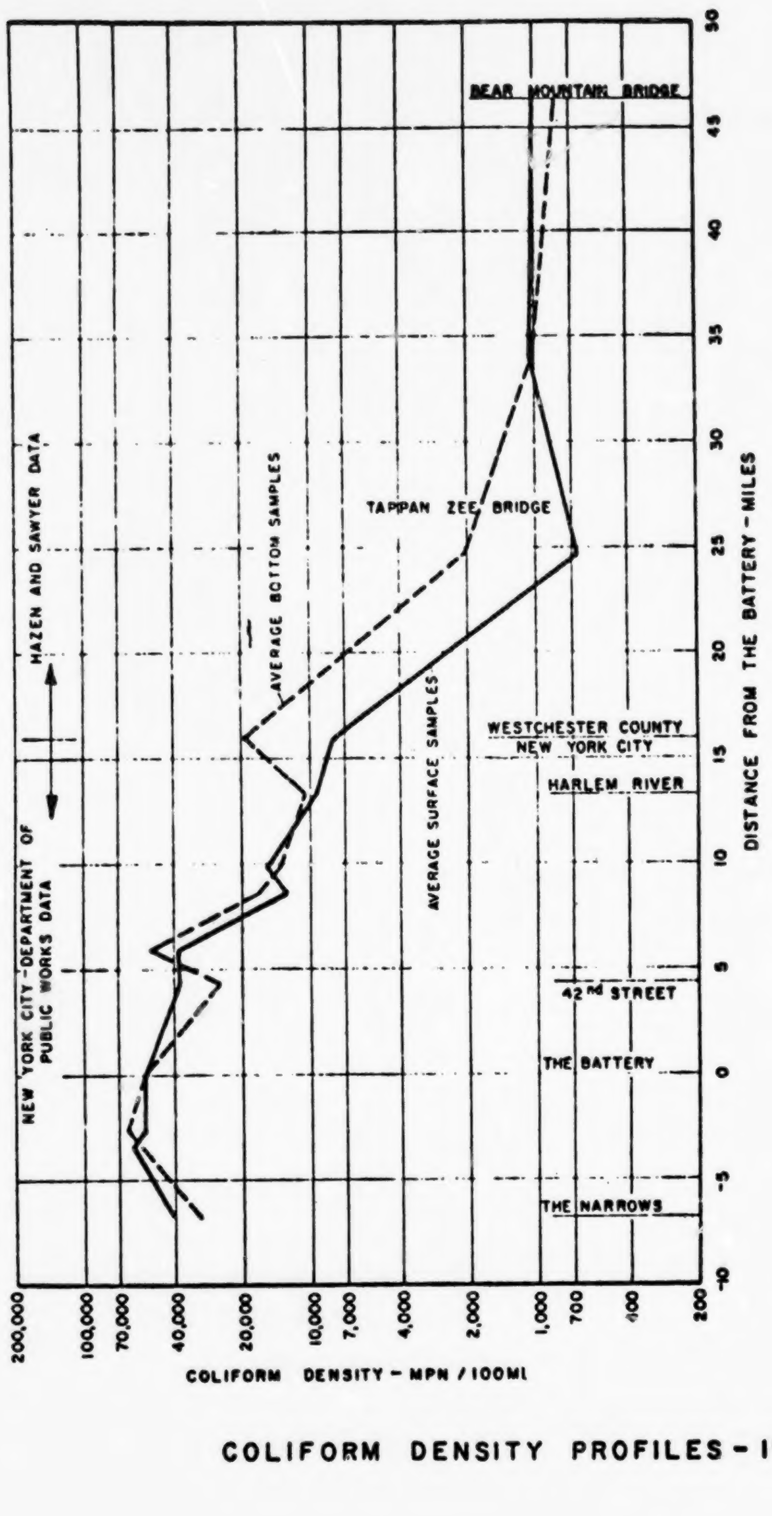

RARITAN BAY PROJECT
CONFIRMED COLIFORM DENSITIES
GEOMETRIC MEANS PER 100 ml
N
S
BROOKLYN
CONEY ISLAND
NARROWS
STATEN ISLAND
SANDY HOOK
ARTHUR KILL
NEW JERSEY
NEW JERSEY
RARITAN RIVER
MILES

Figure 8

EXHIBIT 15



COLIFORM DENSITY PROFILES - 1959

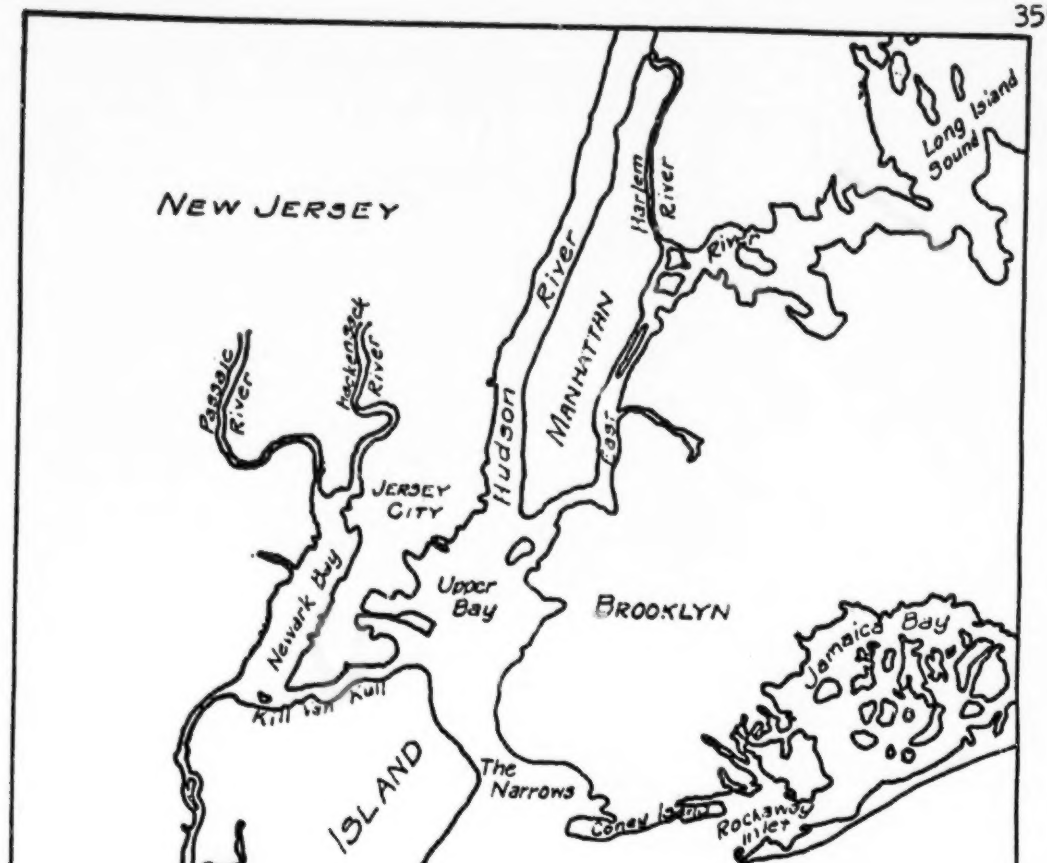

NEW JERSEY
Long Island Sound
Harlem River
East River
Hudson River
MANHATTAN
Passaic River
Hackensack River
JERSEY CITY
Newark Bay
Upper Bay
BROOKLYN
Jamaica Bay
Kill Van Kull
STATEN ISLAND
The Narrows
Coney Island
Rockaway Inlet
Lower Bay
Arthur Kill
Raritan River
Raritan Bay
Sandy Hook
Navesink River
NEW JERSEY
0 1 2 3 4 5
Scale - Miles
U.S. Public Health Service
SHELLFISH SANITATION BRANCH
New York, N.Y.

Figure 1 - Map of the Metropolitan New York area.

Thank you.

MR. STEIN: Thank you very much, Mr. Blaschke.

(Applause.)

MR. STEIN: Are there any comments or questions?

(No response.)

MR. STEIN: If not, thank you very much for your statement.

Does that about conclude the Federal presentation?

MR. ANDERSON: Yes.

MR. STEIN: At this point we plan to recess.

Tomorrow we will start with Mayor Wagner, and then hear from the Interstate Sanitation Commission, from New York State, and from New Jersey. We will hear the invitees of New York and New Jersey and the Interstate Sanitation Commission, as well as their statements.

I think we have made some very good progress in getting the case started, and we should be able to make considerably more progress tomorrow, so that we can get on with the conference.

With that, we will stand recessed until 9:30 tomorrow morning, at the same place.

(Whereupon, at 4:55 p.m., the conference was adjourned until Wednesday, September 29, 1965, at 9:30 a.m.)